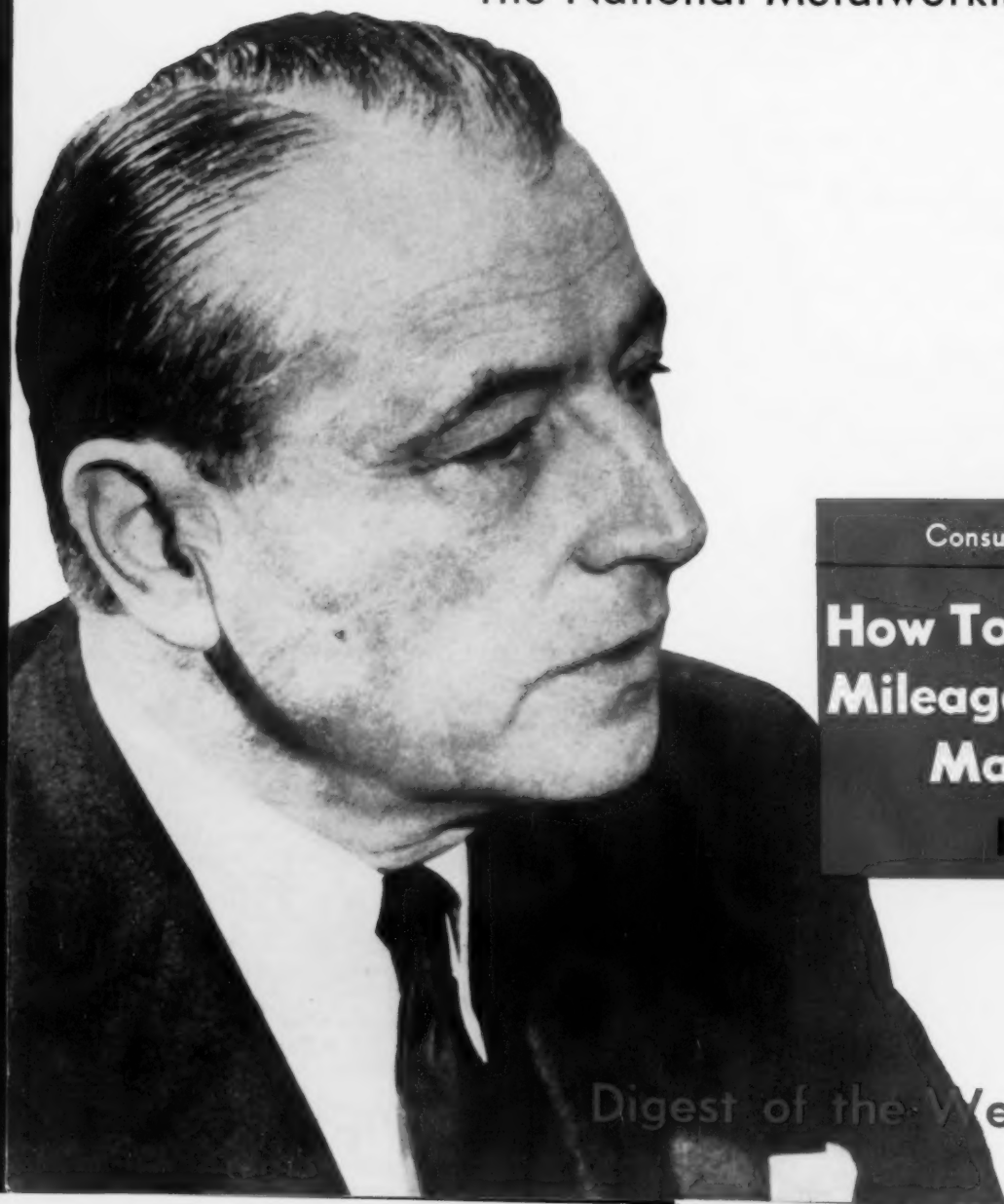


May 31, 1956

The **IRON AGE**

The National Metalworking Weekly

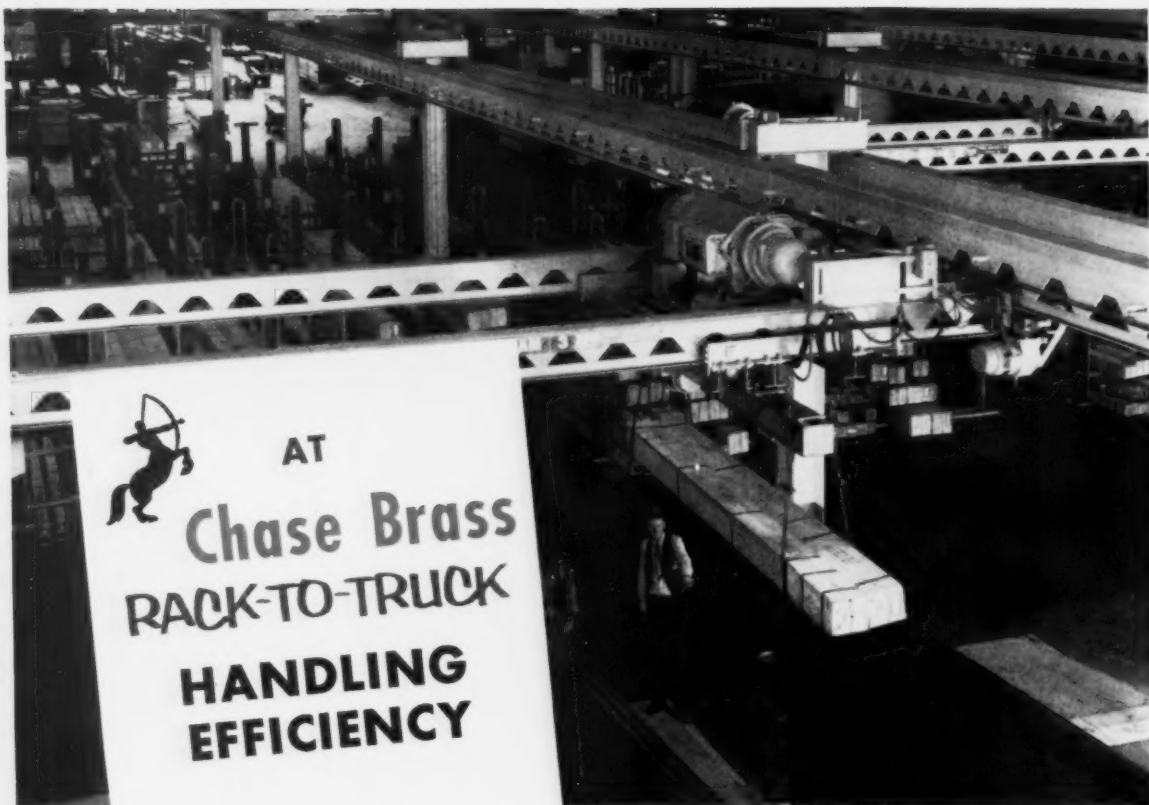


Consultant Semlow

**How To Get More
Mileage From
Management**

P. 19

Digest of the Week P-2



AT
Chase Brass
RACK-TO-TRUCK
HANDLING
EFFICIENCY

One of the six Chase Trambeam cranes moving material from shipping dock racks to truck. Trambeam keeps aisles free, provides orderly handling and a neat, uncluttered floor.

TRAMBEAM *expedites stacking, loading*

Six Trambeam Overhead Handling Systems at the Cleveland Mills of the Chase Brass & Copper Co., load twelve trucks simultaneously. Neat dock-side racks are previously stacked with ready-to-ship material by these Trambeam cranes... then they load the material as needed onto the trucks. Each crane is push-button controlled and operated by one man, assuring fast, easy handling. Later, should Chase wish to increase shipping speed even more, another crane can be added to each system and both racking and loading can then be done at the same time. Many other Trambeam systems are in operation at the Chase

Cleveland Plant and Chicago and Los Angeles Warehouses—all doing specialized handling jobs—proving the versatility, efficiency and economy of the Trambeam method.

Trambeam flexibility can be applied to your operations for fast, low-cost handling. Write for our catalog and the name of your Trambeam distributor... his experience in planning overhead handling systems—large or small—will save you money and assure desired results.

WHITING CORPORATION

15601 Lathrop Avenue, Harvey, Illinois



Chase Brass & Copper Co. makes full use of overhead space with versatile Trambeam, here shown moving 2000-lb. coils in plant interior.



TRAMBEAM



A view of Trambeam operation at Chase shipping docks from the Trambeam-stacked storage racks.



Welding Steel Plates for Power Presses

Here, in the making, are the frames for two sturdy power presses, designed to give years of trouble-free service. The frame on the left is for an open-back inclinable press. At the right is the frame for a 100-ton straight-side, double-crank press. These are only two of the many types and sizes of presses, shears and

other equipment being manufactured by Niagara Machine and Tool Works, of Buffalo, from welded Bethlehem steel plates.

The uniform quality of Bethlehem plates assures sound welds, provided of course that good weld-

ing techniques are followed. Bethlehem plates come in a full range of sheared and universal mill sizes.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation.

BETHLEHEM STEEL



May 31, 1956—Vol. 177, No. 22

The **IRON AGE****Digest of the Week in Metalworking**

Starred items are digested at right.

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NEWS DEVELOPMENTS**STEEL PRODUCERS START TO ACT BEARISH**

P. 23

AISI meeting brings out bearish attitude of most steel producers. But they aren't pessimistic enough to make commitments to sell more to foreign customers. Inland Steel president advocates new labor policies including long term contract.

STEEL INVENTORY PICTURE IS MISLEADING

P. 24

Stories of 60-90 day inventories don't tell whole story. Many products are still tight and inventories are far out of balance. Plates and oil country goods are still without any inventory



buildup. Automakers are up to maximum. No abnormal buildup is expected.

FRINGE BENEFIT COSTS RISING AGAIN

P. 26

Metal stamping industry may expend a record \$100 million this year, a Pressed Metal Institute survey reveals. Use of profit sharing, bonus plans growing.

SAFETY CONFERENCE SEEKS AID OF WIVES

P. 27

Women at home can do a lot to help stem the rising industrial accident rate, President's Conference says.

THE IRON AGE



MANAGEMENT may be the last to realize that the expanding economy will need conservation of its own talents. Walter J. Semlow, noted management consultant, explains how to keep pace with mounting responsibilities. See Special Report P. 19.

AUTOMAKERS SOOTHE DEALERS BEFORE CONGRESS ACTS P. 36

While Congress introduces bills to aid auto dealers, manufacturers beat them to the punch by correcting some admittedly bad practices. Freight adjustments are also designed to place competition on even level. GM's new dealer relations policies are now seen taking effect.

FEATURE ARTICLES

IS TIN-NICKEL THE PLATING FINISH YOU NEED? P. 59

Keep your eye on tin-nickel alloy plating. Not long out of the laboratory, it's already a commercial success. One reason: Its combined decorative and protective properties are not available in any other electroplated finish. The alloy plates directly on most basic metals. Solution has a high deposition rate, superior throwing power, and is easy and inexpensive to control.

COOLANT SWITCH INCREASES MACHINING NEEDS P. 62

Search for ways to boost machining speeds, achieve better finishes, get longer tool life can take many paths. Cutting fluids fit into one area of investigation—and it can be an important one. This firm switched to a new synthetic cutting fluid. Speeds went up by 50 pct in some cases.

GOOD CONTROL MAKES TITANIUM WELDING A SHOP TOOL P. 64

Titanium weld-fabrication in mass production still presents difficulties to metalworkers, large and small. This practical Westinghouse report on its own massive test program sheds light on a host of previously puzzling problems. Even in high volume line setups, ductile joints with high yield strength are possible.

LOW CARBON, LOW NITROGEN IMPROVE STAINLESS P. 67

Vacuum melting helps provide stainless alloys with a variety of improved properties. But it's not alone the answer to higher rupture strengths, creep resistance, and optimum ductility. Carbon and nitrogen content differences as small as 0.002 to 0.004 pct take on a practical as well as theoretical importance in improving elevated temperature properties.

REPLACE FURNACE FASTER BY OFF-SITE CONSTRUCTION P. 72

There come times when even your busiest equipment must be replaced in the same location. But sometimes, careful preplanning can cut downtime lost to surprisingly low levels. Consider, for instance, how Granite City Steel trimmed off 4 to 6 weeks time in replacing an old blast furnace.

MARKETS AND PRICES

INTEREST GROWS IN COKE CHEMICALS P. 28

Steel plant output of these byproducts is spurred on by good markets and attractive prices. Competition with petroleum industry suppliers is still limited.

TOOLING-UP FOR AIRCRAFT IS TIME CONSUMING P. 47

Part of that nine years from plan to bomber flight is taken up in getting needed specialized machine tools. New tooling techniques may aid, but long-range solution to the problem requires using more money and engineers.

FARWEST EXPANSION LEADING NATION P. 45

West Coast area does not live and grow on aircraft alone, says IRON AGE Editor-In-Chief Tom Campbell in industrial report. Activity in metals, machinery and missile production has important role, also.

BRITISH-RED TRADE IRKS WASHINGTON P. 41

By stretching "special circumstances" provision in trade agreements with U. S., the British are stepping up shipments to Communists. House-Senate members see this action as negating our own foreign aid to anti-Communist bloc.

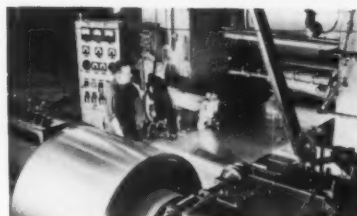
STEEL STOCKS ARE HIGH BUT OUT OF BALANCE P. 93

Shortage of plates, structurals and other items in spot shortage make total steel inventories misleading. But steel is heading into a third quarter letdown to be followed by upsurge in fourth quarter.

NEXT WEEK:

WILL TITANIUM EVER GO COMMERCIAL?

Commercial reality? Publicity mirage? Defense luxury? Experts, answering specific questions in this special report, appraise the current metallurgical wonder and its possibilities. Photo courtesy of Titanium Metals Corp. of America.

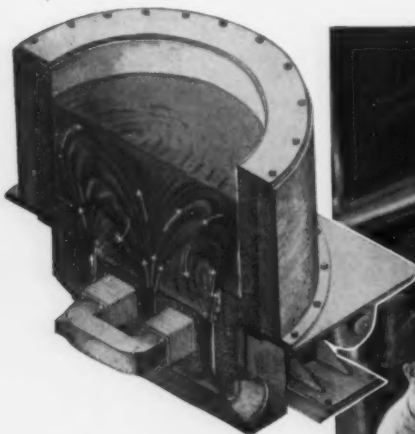


Hard-To-Melt Bronzes Successfully Handled

In

AJAX INDUCTION FURNACES

Brass and bronze foundries all over the country have found AJAX-TAMA-WYATT induction furnaces a reliable tool for melting silicon bronzes, aluminum bronzes, leaded bronzes, phosphor bronzes, and other high strength alloys. Operation is highly economical due to the good uniformity of the alloys, low ratio of rejects, drastic reduction of metal losses, and clean operating conditions. This recent development opens the field for the use of AJAX induction furnaces in all foundries where difficult-to-melt alloys are handled.



Cross section of AJAX-TAMA-WYATT twin coil induction furnace such as used at the Torrance Brass Foundry. Heat is produced within the molten metal in the secondary channels and conveyed throughout the melt by electromagnetic circulation, resulting in minimum metal losses and high uniformity of alloy. Temperature is automatically controlled.

Baseball Fans—Do you recognize this man? He is Rocky Bridges, Cincinnati Redleg infielder, keeping in condition during the winter season at Torrance Brass Foundry, Torrance, Cal.



(Photograph courtesy of Long Beach Press-Telegram, Long Beach, Cal.)

The furnace pictured here is melting aluminum bronze at the Torrance Brass Foundry, Torrance, Cal., operating at a temperature of 2400 F, for the production of high strength centrifugal castings.

This unit is rated 100 kw. Note also the clean, smokeless operation as shown in the unretouched photograph.

AJAX

TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.



INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax-Heating High Frequency Induction Furnaces
AJAX ELECTRIC CO., The Ajax-Induction Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Steel Induction Furnaces for Melting



HOW *Carpenter* USES RARE EARTH ELEMENTS TO IMPROVE FORGEABILITY OF ALLOYS FOR ELEVATED TEMPERATURE SERVICE

The value of rare earth elements in certain alloys for elevated temperature service can be seen in this hot forgeability test. Cast cones, identical except for the addition of cerium in one, are heated to forging temperature and upset or hammered into flat "pancakes". Note the relative freedom from cracks and tears in the specimen containing cerium.

What does this improved hot workability mean to you? It means better forged finishes requiring less machine clean-up . . . less wasted steel . . . fewer rejects . . . faster fabricating.

Carpenter alloys for elevated temperature service have an enviable reputation for improved forgeability, and exceptional cleanness which meets the strictest inspection requirements.

Carpenter pioneering in tool steels, super corrosion resisting steels and free-machining stainless steels has

helped hundreds of companies to improve products and cut costs. This same specialty mill experience can help you do a better, low cost job on any parts or products you make for high temperature service. It'll pay you to investigate. Contact your Carpenter Representative, or drop us a line on your company letterhead. The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.

Specify Carpenter alloys for elevated temperature service and get these three big advantages . . .

- Improved Forgeability
- Greater Uniformity
- Cleaner Steel



Carpenter STEEL

Improved Alloys for Elevated Temperature Service

Torture Test for Spring Steel

* Note severe bending parallel to the direction of rolling.



Again Proves SHARON Superiority

In the short space of less than 11-inches this piece of Sharon Spring Steel has been blanked, punched, drawn, twisted, folded and sheared — formed into precision fasteners — at speeds that test the imagination.

An ingenious seven-station progressive die does the job, but it requires the finest in spring steels to get maximum efficiency, especially where bending parallel to the direction of rolling is required. That's why this concern, a major supplier of fasteners to the automotive industry, specifies Sharon Quality Spring Steel.

Sharon's consistent uniformity of analysis, hardness and size minimizes rejects — assures maximum life for expensive dies.

If you are a user of spring steels it will be well worth your while to specify Sharon Quality Spring Steel — another fine product by one of the world's largest producers of special steel strip.

SHARON STEEL CORPORATION
Sharon, Pennsylvania

SHARONSTEEL

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EDITORIAL

Keep Your Head in Months Ahead

♦ THE CLOUDS are gathering. The I-told-you-so's are meeting. The depression blues boys are getting ready to sing. Auto sales are sour; production cutbacks are deep. Money is tight and a lot of people are running scared.

Looking at it now, it seems it was a rather foolish thing for the Federal Reserve Board to pick the time it did to make money tighter than it had been—and costlier. (We said so at that time; and we still think so.)

The farmers are as mad as hornets because they feel someone is giving them the business. Today's farmers don't always take as long as yesterday's farmers to discover—or admit—who really did give them the works.

The fellow who is up to his ears in installment payments isn't going to read the latest volume on economics to get the real low-down on tight money, higher interest rates and what kind of inflation makes nonsense. He's looking for a fall guy.

The businessman who wanted to—and should—expand isn't going to act as if he favors hard money or loves the present Administration. At least not when he can't get the money; or has to pay too high a price for it.

Now all of these people, including those who scare easily about the future of our country, are going to be unhappy about business news over the next few months. The big question is, should they get unduly alarmed?

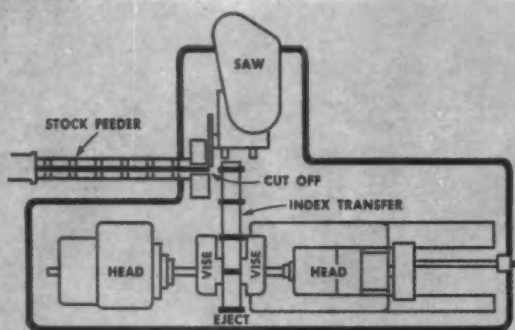
The country has not fallen apart; nor will it. There is no depression in the offing. Basic conditions are sound; so sound that the foolishness of tinkering too seriously at the wrong time with the money and credit situation won't undermine things.

Conditions may look a little bad to you now. But are you one of those who believes things are going to pot—fast? If you are—and if there are many like you—things can become much worse. Even a strong economic condition can be tunneled by too many misjudgments.

If you keep your head in the months ahead; if you believe that the present storm is but a misguided squall, then you will be ahead. You will grow, profit and mature—and be a leader; not a follower.

Tom Campbell

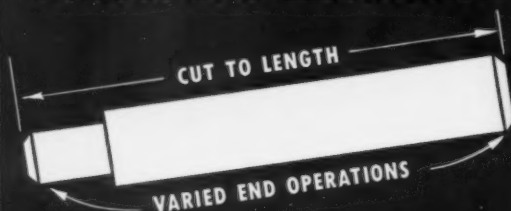
EDITOR-IN-CHIEF



HOT BED OF ACTIVITY

Motch & Merryweather's new transfer machine widens the horizon for the simultaneous double-end machining of bar stock or tubing. Combined with cut-off to accurate length are: centering, chamfering, turning, drilling, or boring. Box mill turning is performed along with center drilling and chamfering. From stock pile to discharge, all operations can be fully automated. For the quickest answer to speed your stock processing, send us your part drawing.

Simultaneous STOCK CUT OFF and DOUBLE END MACHINING

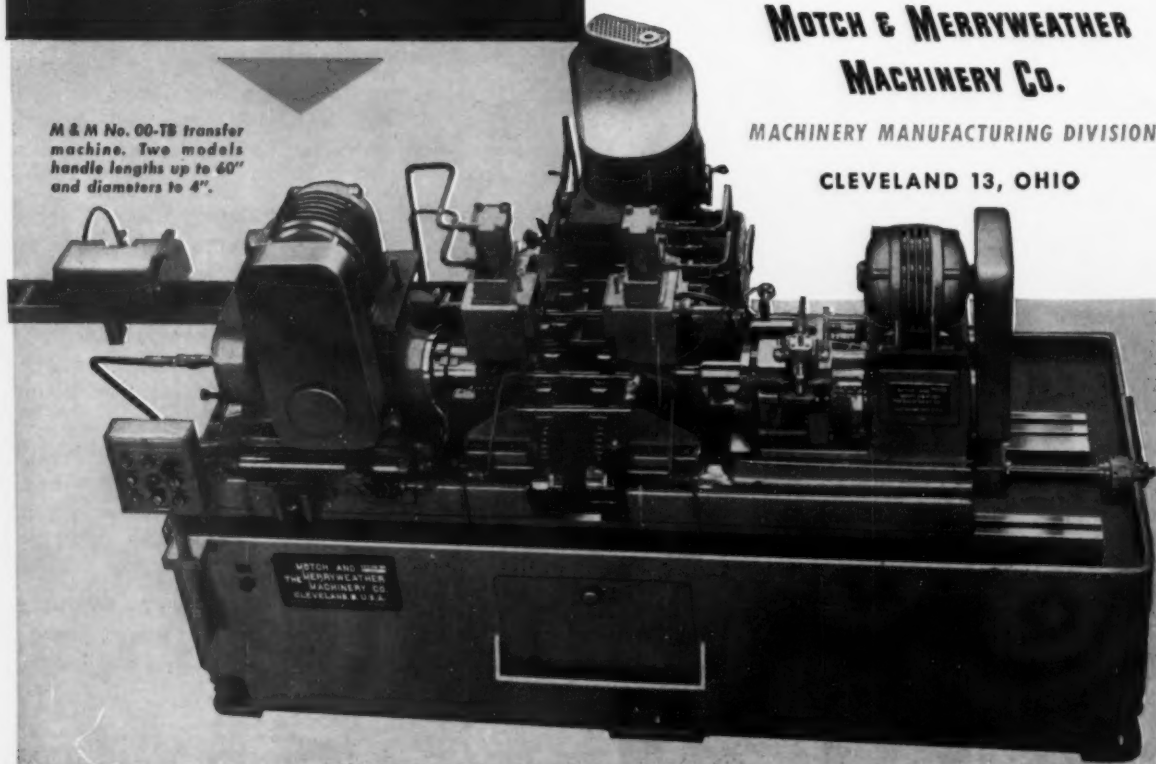


M & M No. 00-TB transfer machine. Two models handle lengths up to 60" and diameters to 4".

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO



BUILDERS OF AUTOMATIC PRECISION CUT-OFF, MILLING, AND SPECIAL MACHINERY

dear editor:

letters from readers

Throw-Away Ceramic

Sir:

We would appreciate three copies of your excellent article "Throw Away Ceramic Turns New Profits From Old Lathes," which appeared in your May 3 issue, on pages 91 to 94. We understand these reprints are available.

You may be interested to know that we find THE IRON AGE very useful in the Comptroller's Office in keeping in touch with new production problems and developments. If we didn't find it so interesting, we certainly wouldn't find time to read it. *I. L. Ingalls, Assistant Comptroller, American Machine & Foundry Co., New York.*

Welding Feature

Sir:

Your article on welding "How To Get More For Your Metalworking Dollar", which appeared in the April 26, 1956 issue, is extremely interesting and informative. Articles of that type are just what the doctor ordered for Value Engineering.

It would be appreciated if you would send me three free copies. *F. Hunter, Value Engineering Branch, Code 246, New York Naval Shipyard, Brooklyn.*

Liquid Gasketing

Sir:

In the April 19th issue of THE IRON AGE you carried an article entitled "Can Liquid Gasketing Cut Your Costs?" We were interested in the article as the Gray Co. manufactures pumps and other equipment which is generally used for dispensing this material. The top

cut in your article showed our control valve in operation.

We do appreciate such an article, of course, but wanted to bring one statement to your attention. The fourth paragraph states "In this case, application is by extrusion from a high-pressure lubricating pump." We don't know where such information was obtained—possibly some manufacturers do use a high-pressure lubricating pump. It may be of interest to you to know that we manufacture a complete line of heavy-material pumps which are not by any stretch of the imagination grease pumps. *S. A. Fletcher, Sales Div., Graco Products, Minneapolis.*

Behind U.S.'s Labor Policy

Sir:

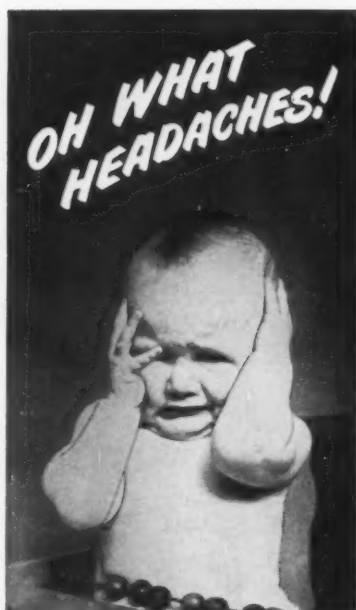
I have just finished reading with great interest the article in the May 10 issue by Mr. Tom Campbell



U. S. Steel's John Stephens

entitled, "Behind U. S. Steel's Labor Policy."

Please send me 35 copies if available for distribution to key personnel. *G. Lewis, Jr., Vice President, Lubbock Steel Works, Inc., Lubbock.*



WISH I HAD ORDERED FROM GARRETT

They never let you down on deliveries when you have to keep production going full speed.

You get what you order when you order it . . . from Garrett. No waiting for late shipments. You can't beat Garrett service. No worries about Garrett . . . quality. Every Garrett washer, hose clamp, stamping or assembly is right up to the peak of quality. High quality is assured by Garrett's "statistical quality control" system.

Next time no more headaches for me. I'll order from Garrett. Why don't you do the same when you need . . .

**LOCK WASHERS
FLAT WASHERS
HOSE CLAMPS
STAMPINGS**

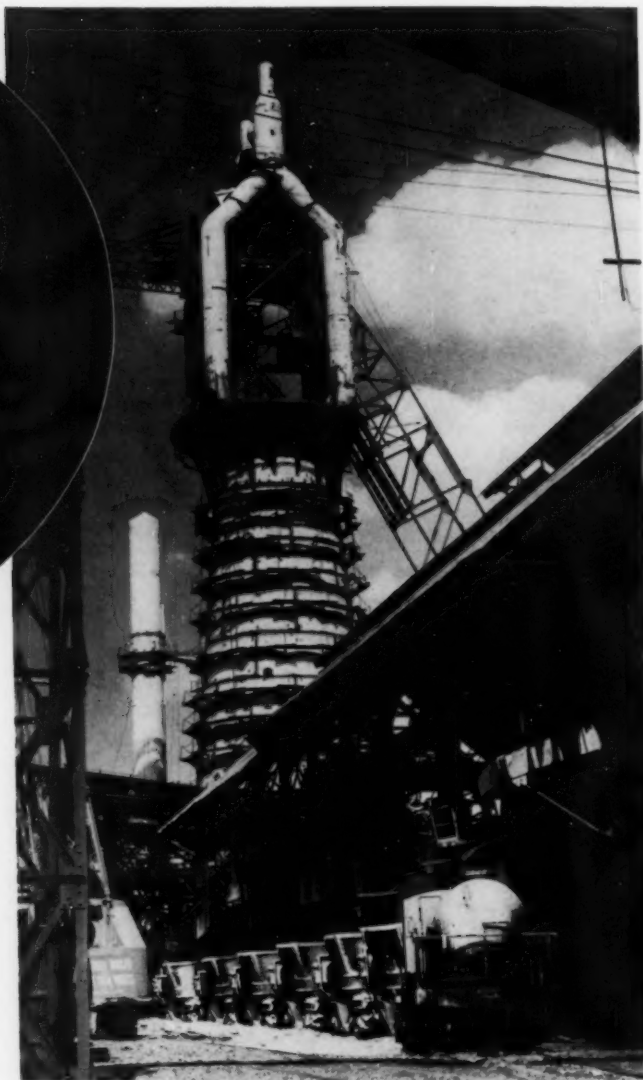
Manufactured by
GEORGE K. GARRETT CO., Inc.
Philadelphia 34, Pa.



"No Rock in this ROLL!"

Blast Furnace
Moved and
Installed on
New Foundation...

**at Granite City
Steel Co.**



EICHLEAY SERVICES

- Industrial Installations
- Construction of Heavy Foundations
- Building and Machinery Moving
- Shoring - Rigging

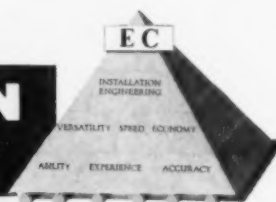
This new Blast Furnace of the Granite City Steel Company weighing 635 tons was designed and built by Koppers Company, Inc. It is shown at the end of its 84' horizontal move just before being lowered 3'-4½" to its final resting place on top of the nine furnace columns. The 172'-6" steel furnace shell was built off-site and moved to the pictured position in one hour and 57 minutes. Lowering of the furnace took an additional 11 hours.

The moving of heavy structures, such as, Blast Furnaces, Open Hearth Furnaces and Heating Furnaces has been perfected to a high degree of skill by the Eichleay Corporation. Each procedure was carefully evaluated to obtain the maximum efficiency with a minimum cost. This particular program is estimated as having saved between four to six weeks operating time for Granite City Steel Company.

Eichleay
ESTABLISHED 1875

CORPORATION

33 South 19th St., Pittsburgh 3, Pa.
1180 Richard Ave., Santa Clara, Calif.



fatigue cracks

by William M. Coffey

New Series

If you notice a certain similarity between this week's cover and the one on our March 1 issue (see cut), you're right. This week's cover story is the second in a new series of articles written for metalworking management people by top experts in various fields.

In the first article of the series, economist Eliot Janeway set forth his Defense Cycle theory of business forecasting as opposed to the more orthodox thinking of the Business Cycle theorists. The ar-



Janeway on Defense Cycle

ticle brought a lively response both pro and con (mostly pro) from many readers whose job is to chart their company's business progress.

On p. 19 we bring you another article on a serious management problem—the overworked executive. Here management consultant Walter Semlow points up the greatly increased workload on business executives—and tells us what can be done to cut it down and increase management's efficiency.

We hope you'll find this one as stimulating as the first, since we've got a number of them lined up for you. Others coming up will

cover labor, marketing, plant protection, etc.—all written by people well-respected for their expert knowledge of the subject they're writing about.

Attention Gourmets

Boasting a weight of 135 lb (give or take 20, mostly take) we normally don't have any trouble keeping the old shape in trim. But a look at upcoming days, weeks and months dedicated to tickling the palate, once more reminds us we should not leave that calorie book home this summer.

All set, let's go!

June 1—National Pickle Week (no trouble here)

June 1 to 30—Dairy Month

June 24 to 30—International White Bread For Energy Week

July 1 to August 31—Ice Cream Festival

July 1 to 31—National Hot Dog Month (nice tie-in, see below)

July 1 to 31—Picnic Month

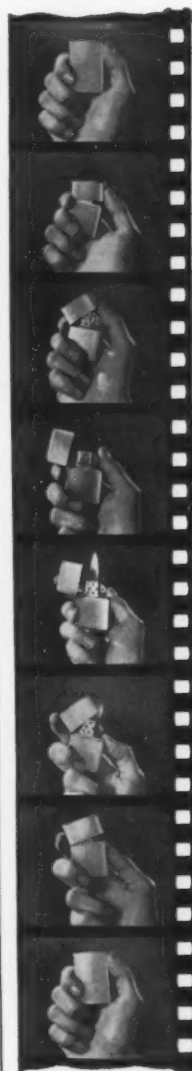
August 1 to 31—National Sandwich Month (just missed, see above)

August 19 to 25—International Rye Bread For Variety Week (timely, see above)

October 7 to 13—Save the Horse Week (?)

New Puzzler

The largest 3 by 30 in. plank which will fit inside of a room that is cylindrical in shape is exactly 25-ft in length. It is found by careful measurement that the plank makes an angle of $56^{\circ} 43' 22.227''$ with the circular floor of this room. What are the radius and height of the room correct to at least two decimal places?



THE

ZIPPO

FLIP...

HINGES

ON

SEYMOUR

Zippo lighters "flip their lids" on hinges made of SEYMOUR NICKEL SILVER—the metal that combines beauty with durability. Malleable and ductile, this

fine metal is found wherever uniform high quality is demanded. Nickel silver users everywhere say . . .

"Specify Seymour—you KNOW it's good!"



SEYMOUR



THE SEYMOUR MANUFACTURING CO.
2 Franklin Street, Seymour, Connecticut



No. 17 Billet Shear. Capacity, 10" rounds or 9" squares, 6 strokes per minute.

"Buffalo" Billet Shears are built in 11 sizes to handle *your* size rounds, squares or flats. The smallest one shears thirty 2¼" rounds per minute; the largest, six 10" rounds per minute. Rigid arc-welded steel plate frames—"power" lubrication—air operated clutches, counterbalance and hold-down—are some of the "Q" Factors* that assure you years of service with practically no maintenance.

a "Buffalo" billet shear did it all in 10 minutes!

You're looking at a hundred 7" square billets readied for forging in just ten minutes by a "Buffalo" No. 15 Billet Shear with automatic feed table and back gage. This is just a sample of the high output of "Buffalo" Billet Shears in the nation's leading shops.

And note the clean, square faces of each cut. There's no smearing to conceal porosity, as with burning or sawing. The shear penetrates only 3/16", localizing a neat, accurate vertical fracture. Divisions are uniform in dimensions and weight. Your quality keeps up with your speed!

Write for Bulletin 3295-C for all details.

**The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.*



BUFFALO FORGE COMPANY

Machine Tool Division

492 BROADWAY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING

PUNCHING

SHEARING

BENDING

dates to remember

JUNE

AMERICAN GEAR MANUFACTURERS ASSN.—40th annual meeting, June 3-6, The Homestead, Hot Springs, Va. Society headquarters, Empire Bldg., Pittsburgh 22, Pa.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC.—Summer meeting, June 3-8, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters, 29 W. 39th St., N. Y.

AMERICAN SOCIETY OF CIVIL ENGINEERS—National spring convention, June 4-8, Knoxville, Tenn. Society headquarters, 33 W. 39th St., N. Y.

EXPOSITIONS

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

THE SOCIETY OF THE PLASTICS INDUSTRY, INC., June 11-15, New York City.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

SOCIETY FOR ADVANCEMENT OF MANAGEMENT—Small business conference, June 7-8, Hotel Statler, N. Y. Society headquarters, 74 Fifth Ave., N. Y.

THE NATIONAL ASSN. OF METAL FINISHERS—Annual meeting and fifth management seminar, June 17-18, Mayflower Hotel, Washington, D. C. Society headquarters, 35 E. Wacker Dr., Chicago.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Semi-annual meeting, June 17-21, Hotel Statler, Cleveland. Society headquarters, 29 W. 39th St., N. Y.

AMERICAN ELECTROPLATERS' SOCIETY—43rd annual convention, June 18-21, Hotel Statler, Washington, D. C. Society headquarters, 445 Broad St., Newark, N. J.

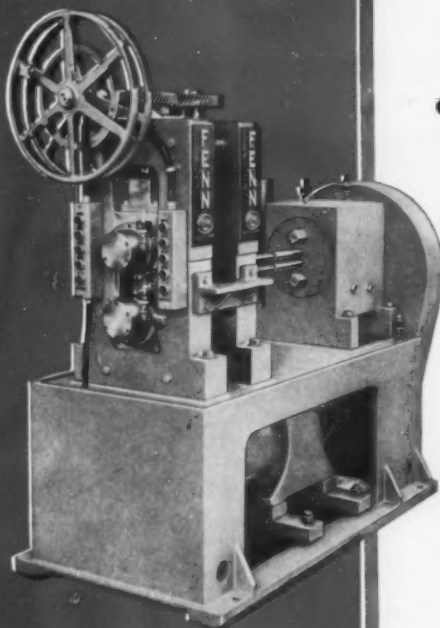
AMERICAN MARKETING ASSN.—National conference, June 20-22, Hotel William Penn, Pittsburgh. Society headquarters, Aluminum Co. of America, Pittsburgh.

PRESSED METAL INSTITUTE—National sales conference, June 22, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

ALLOY CASTING INSTITUTE—Annual meeting, June 24-26, The Homestead, Hot Springs, Va. Society headquarters, 32 Third Ave., Mineola, N. Y.

DROP FORGING ASSN.—Annual meeting, June 24-27, The Homestead, Hot Springs, Va. Society headquarters, 605 Hanna Bldg., Cleveland.

NEW LABORATORY SIZE ROLLING MILL



COMBINES
**PRECISION
VERSATILITY
COMPACTNESS
MODERATE
COST**

**EXTRA HEAVY
BEARINGS PERMIT
ROLLING NEWEST
AND TOUGHEST
METALS**

MODEL 4-053 is the newest and finest Precision Rolling Mill engineered especially for metallurgical and research laboratories in industry and colleges . . . or for a production mill in many applications. Extremely flexible it can be used as (1) a two-high, (2) a four-high with work rolls driven, and, (3) a four-high with back-up rolls driven. This unique three-way drive, and a full line of accessories, permit a complete range of reductions in both hot and cold rolling. Write for complete specifications or copy of our rolling mill catalog.



FENN ENGINEERING SERVICE

is available at all times to help you solve rolling problems. Fenn engineers will also gladly test-roll samples of your materials.



Precision Rolling Mills



Turks Heads



Wire Shaping Mills



Swaging Machines



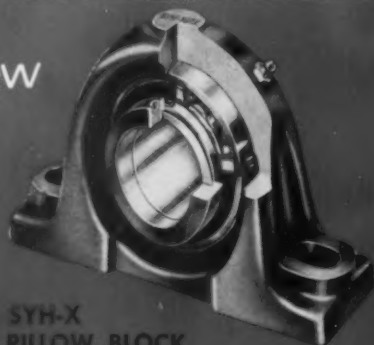
Wire and Tube Drawing Machines

FENN MANUFACTURING COMPANY • 303 FENN ROAD • NEWINGTON, CONNECTICUT

Most Positive Bearing For Dirt Exclusion and

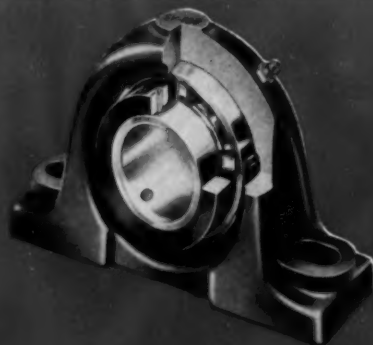
now - a complete line of unit pillow blocks

New



**TYPE SYH-X
UNIT PILLOW BLOCK**

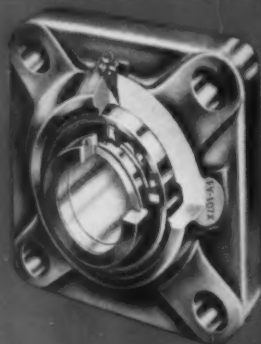
For eccentric lock shaft mounting — interchangeable with pillow blocks having reduced center heights.



**TYPE SY
UNIT PILLOW BLOCK**

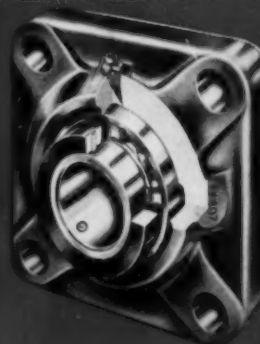
For set screw shaft mounting.

New



**TYPE FY-X
UNIT FLANGED MOUNTING**

For eccentric lock shaft mounting.



**TYPE FY
UNIT FLANGED MOUNTING**

For set screw shaft mounting.

Designers!

HERE'S HOW SKF HELPS MAKE YOUR PRODUCT BETTER

In offices throughout the U.S.A., SKF maintains the bearing industry's most experienced sales engineering staff. If bearings are part of your product, call the nearest SKF District Office for any engineering assistance you may need.

Operating Men!

LOOK FOR THE SIGN OF YOUR AUTHORIZED SKF DISTRIBUTOR

It is your guarantee of complete stocks and unbiased engineering assistance because only your SKF distributor stocks all types of bearings—ball, roller, spherical and tapered roller. You'll find his name in the classified telephone directory.

 BALL BEARINGS

 CYLINDRICAL ROLLER BEARINGS

 SPHERICAL ROLLER BEARINGS

Seal Ever Devised Lubricant Retention...

...fully interchangeable with other makes

SKF UNIT PILLOW BLOCK FEATURES

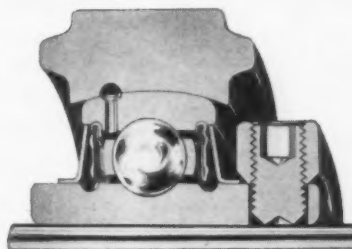
- Long inner ring distributes load over greater shaft area.
- The spherical outer ring of the bearing compensates for initial misalignment.
- Interchangeable with existing bolt-hole spacing and center height.
- Grease fitting in housing for relubrication of bearing.
- Bearing is easily replaced.
- Bearing is pre-lubricated and sealed at SKF — it's ready for operation.
- All housings are cast in one-piece for durability.

Special Features

Shown on the right is SKF's Bearing Seal Design which is the most effective ever developed. The seal itself, made of a specially designed metal backing plate and a Du Pont Fairprene washer, is staked into the bearing outer ring and makes *light* but *positive* contact with a groove in the bearing inner ring—a contact seal that acts as a relief valve and *can't pop out* when lubricant is added. This Red Seal is augmented by a rotating flinger—together they provide positive dirt exclusion and lubricant retention.

7701

SKF RED SEAL



SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.
—manufacturers of **SKF** and HESS-BRIGHT® bearings.

SUBSIDIARY

TYSON BEARING CORPORATION, MASSILLON, OHIO
—manufacturers of *Tyson* tapered roller bearings.



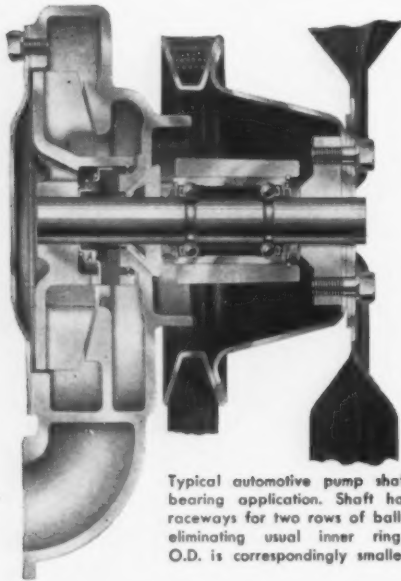
 **Tyson** TAPERED ROLLER BEARINGS

May 31, 1956

FACTS

about

NEW DEPARTURE BALL BEARINGS



Typical automotive pump shaft bearing application. Shaft has raceways for two rows of balls, eliminating usual inner rings. O.D. is correspondingly smaller.

FAN AND PUMP SHAFT BEARING IS ADAPTABLE TO MANY USES!

This sealed and "lubricated-for-life" bearing with integral shaft was originated by New Departure specifically to simplify automotive fan and water pump mounting. Since its inception, it has reduced bearing maintenance requirements to virtually zero in millions of car, truck and other engines.

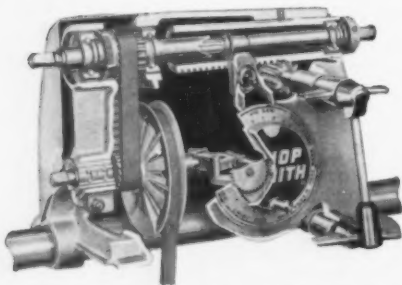
Because of its unique design and ability to locate parts on its shaft against loads from any direction, designers find it a highly *versatile* bearing, adaptable to many other uses.

The manufacturer of a well-known power tool, which combines several tools in one compact unit, employs the pump shaft bearing as a complete intermediate shaft with pulleys on one end and a keyway for tool attachment on the other, with obvious design and performance advantages.

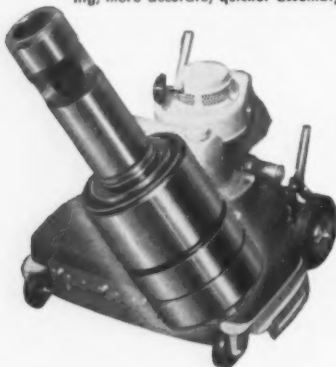
Another manufacturer produces a power mower in which two of these versatile **NEW** Departures with hollow shafts not only support the mower rotors, but permit vertical adjustment of the wheel spindles to regulate cutting height.

So here is another **NEW** Departure adaptable to many uses. New Departure engineers can show you what it and other ball bearings will do to improve your products.

FINE BALL BEARINGS MAKE GOOD MACHINES BETTER



Integral shaft of bearing serves as intermediate shaft in Magna's "Shopsmith". Assures fewer parts, easier machining, more accurate, quicker assembly.



For each McCulloch Mower, New Departure provides two pump shaft bearings with hollow shafts to permit vertical adjustments. Special heat treating gives full hardness at the raceways but adequate toughness in the shaft to withstand hard service.

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

NEWSFRONT

Ceramic Jigs: For Automation

Ceramic jigs, fixtures show promise for carrying parts on automated lines through severe heat, abrasive conditions. Examples are brazing, heat treating. Automation depends on consistent performance, cannot tolerate downtime due to warped, corroded or eroded fixtures. One super-hard ceramic is said to stand up under severe oxidizing conditions, can be quenched from 2400°F without spalling.

Towards More Missile Muscle

Defense Dept. plans to up guided missile commitments. Stimulus comes from recent swift developments of deadlier, longer-range missiles. As against \$938 million contracted for in current fiscal year, military plans on contracts totalling nearly \$1.8 billion during the 12-month period beginning July 1. Missile outlays will climb rapidly in following years.

Straight Diesel Locomotives Coming?

Slated for a relatively short Ohio run, the new 1000 hp straight diesel locomotive pulling the New York Central's Explorer is the first of three such all-diesel engines soon to be operating on American railroads. Most American locomotives currently are of diesel-electric variety. Though an innovation here, both engine and hydraulic transmission on the new train have been used in Europe for 15 years or so.

More Stainless for Supermarkets

New supermarkets are going up at a 1000-per-year clip, underlining increasing importance of their cold storage facilities to stainless steel fabricators. Biotics for food preservation may allow more meat in storage per store without spoilage. One Eastern grocery chain has upped sales by a proven 15 pct in 400 stores, by increasing storage space and meat inventories, improving preservation with biotics.

Collaborative Education Effort

Union-management cooperation for a mutually beneficial objective is exemplified by an industrial electronics course offered members by a Florida local, International Brotherhood of Electrical Workers. The 15-session course aims to keep members abreast of advances in the field; is offered on a voluntary, no-fee basis. GE-furnished material will be used as basis of instruction.

Reciprocating Engine's Here to Stay

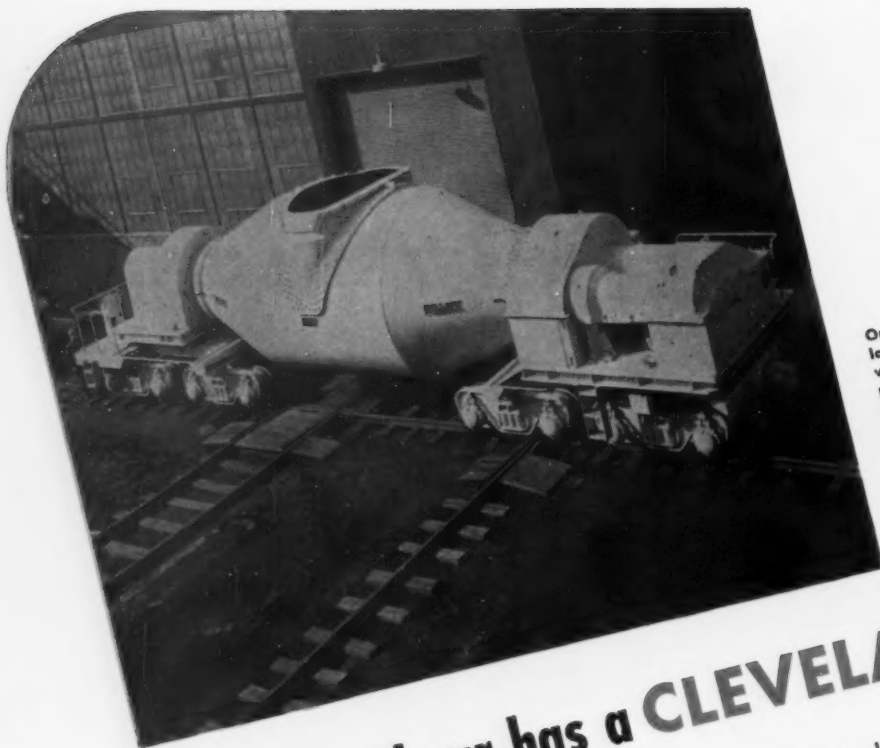
Researchers close to engineering developments in the auto industry are certain the reciprocating engine will be around for a long time to come. Despite recent free-piston, gas turbine engine developments, informed engineers agree that reciprocating engine champions hold several aces up own sleeves. Argument is that these will make position of reciprocating engine much more secure when disclosed.

Titanium Welding Studies

Studies of reactions of three basic categories of titanium alloys to Heliarc welding show a large number of alloys extremely brittle in the as-welded condition. Postheat-treatment restores a large measure of ductility in almost every case, but no single postheat-treatment was applicable to all alloys. Studies covered effects of preheat, postheat treatments on several mechanical properties.

Pinch on Power Expansion?

Work stoppage at South Philadelphia plant of Westinghouse Electric may start pinching industry by next winter. Plant turns out large turbines for power generators, and length of shutdown is curbing utility expansion in some sections. By next winter, situation may reach point where plants will have to postpone scheduled increases in power loads.



One of the world's largest ladle cars, built for one of the world's largest steel companies. Cleveland worm gearing in this car is backed by 44 years of specializing in the manufacture of worms and gears.

200-ton hot metal car has a CLEVELAND drive

CONVEYING 200 tons of molten iron from one location to another is a critical job. Precision engineered equipment is a must. Steady, never faltering control is required always—to turn the ladle left, right, completely over, back to center.

To provide the exactness and accuracy of control required, the William B. Pollock Company, the builder of this 200-ton ladle car, employed Cleveland worm gearing. Even though gear life will be one of continued stress, it will operate dependably through its efficiency. Cleveland worms and gears actually improve in service. The tooth contour remains unchanged throughout the life of the gearing. This means that your Cleveland worm gearing will be as efficient ten, twenty or thirty years from today as it is when new.

Get full engineering data by writing for free Catalog 400. The Cleveland Worm and Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.



CLEVELAND
Worm Gear
Drives



How To Grow Management Talent

Best solution to management shortage is to develop talent within the company . . . Six basic rules on how to do it . . . Shortage growing—By Walter J. Semlow.

Walter J. Semlow

■ A vigorous 62, Walter J. Semlow is president of Barrington Associates, Inc., management consultants, New York City.

He began his business career in market analysis with the sales department of Willys-Overland in Toledo, and there helped pioneer in the use of statistical methods by sales management.

He joined Barrington in July, 1943, and became president in 1950.

Mr. Semlow has been active in the Assn. of Consulting Management Engineers, where he has been one of the leaders in the development of professional standards for consultants. He is now president of the association.

♦ THE TRAGIC SPECTACLE of the nerve-wracked top management executive who collapses from overwork in his late forties or early fifties has become all too common. And the speed and the tensions under which management must work aren't likely to ease off any time soon.

In fact, management's problems will become still larger, more complex and baffling, more wearing on the individual.

Management today is armed with more tools to facilitate decision-making, to determine the odds on business gambles, and to speed the translation of decisions into action and product. The emphasis is continuing to shift at an accelerated pace to "more brains, less brawn," creating greater mental and nervous tensions.

But a catch—and an unexpected one—has developed. Business is threatened with a serious and mounting shortage of management talent. And nowhere is the problem greater than in the metal and heavy industries.

This country's gross national product cannot double in the next 20 years—as economists predict—without placing critical new strains on today's already overextended executives.

Begin At Home

In fact, the projected growth cannot be realized unless we get more mileage from today's managers while we develop on a scale and at a speed unprecedented a new crop of not just replacements, but of reinforcements as well.

Since it is already virtually impossible to locate ready-made and competent managers from outside a company, only one significant alternative is left—make better use of the management talent already within your organization.

Here is a challenge which alert management teams cannot afford to overlook, for where it has been faced realistically and aggressively, dramatic results have been achieved in a relatively short time.

Insuring full effectiveness of the management team is a many-

faceted job, but six conditions are fundamental to a sound overhauling and streamlining of any business:

- 1) A clear understanding by the entire management team of the company's basic objectives and basic policies; what it is the company is trying to accomplish.
- 2) A clear definition of the responsibility and authority of each individual, and of his relations with others.
- 3) A sharply defined and logical organizational structure.
- 4) Constant intelligible and comprehensive communication down and up the line of command.
- 5) Encouragement and implementation of individual executive

■ Second of a series on subjects of particular interest to management. (See Economist Eliot Janeway's article on business forecasting, THE IRON AGE, March 1, 1956, page 30.) Subsequent articles will deal with labor, marketing, and other management problems.

development, and realistic quality control on the results.

- 6) **A comprehensive system of compensation, with an up-to-date incentive system applied at all levels wherever practical.**

The problem facing business today is that too few people—too few, indeed, of the men in responsible management posts—have the knowledge of how to transmit these fundamentals into action. And yet, the job is essentially a simple one.

Burden Grows

Look again at the six fundamentals to a sound business structure:

(1) The basic objectives of any enterprise can be thought through and written down on not more than one or two sheets of type-writing; maybe three sheets for an especially complex one. Examples of basic objectives are those pertaining to growth, diversification, modernization, employee and community relations, position in the industry, and research; in addition to net return on the investment, dividends, and perhaps certain key balance sheet and operating statement items.

The basic policies which determine the ground rules under which the company strives to achieve its basic objectives may also be boiled down in terse but comprehensive style. They call for the same specific definition of relations with employees, customers, stockholders, and with the community in which the business operates.

In order to give all members of management the fullest sense of participation and belonging, it is necessary that the basic objectives and basic policies (the philosophy of the enterprise), be thoroughly understood and observed by all.

Write It Down

This is above and beyond the encyclopedic, detailed procedure manuals which are a common part of the mechanics of operation of

most large businesses. This promulgation of the bigger, more fundamental, and overriding rules helps the responsible management group get a broader grasp of the management purpose, a task that will enable much more dynamic interpretation of the cold, dry, manualized procedures.

Statements of company policy and objectives should be disseminated in complete form from the chief executive officer of the company throughout all levels of management. Certain financial detail could be omitted at the foreman level but the need to produce an adequate return for stockholders should be emphasized as an important basic purpose.

Insuring that these important statements are understood and not filed and forgotten is achieved principally through constant reiteration in the company house organ, in general and special meetings wherein the summing up of these objectives could be an almost standard opening and in procedural manuals to which all levels of management make frequent reference in connection with their normal supervisory duties. It is literally a never-ending job.

(2) No management team will function successfully until it has a clear-cut analysis of every

key job, and a definition of its exact responsibilities, its span of authority, and its relationship to other company functions.

To the Point

Over-elaborateness in definitions are to be avoided, but vagueness in the delegation of responsibility causes invisible but real losses in time and effectiveness.

Analyses of responsibilities, key duties, and standards of performance must be written and clear if they are to be effective.

We often find that when these analyses are not written, the responsibilities will either be overlooked entirely or slighted, or will gravitate to the most acquisitive "empire builder" in the management group, and be improperly handled there. The problem is likely to develop at any levels and with any jobs from vice president to foreman.

The best method of insuring complete understanding of responsibilities and delegation of authority is to have the individuals who are affected participate in the development of their own position analyses. By this method, differences and misunderstandings are ironed out before they fester into a full grown "frictional boil."

(3) Next comes the organization of the components of the en-

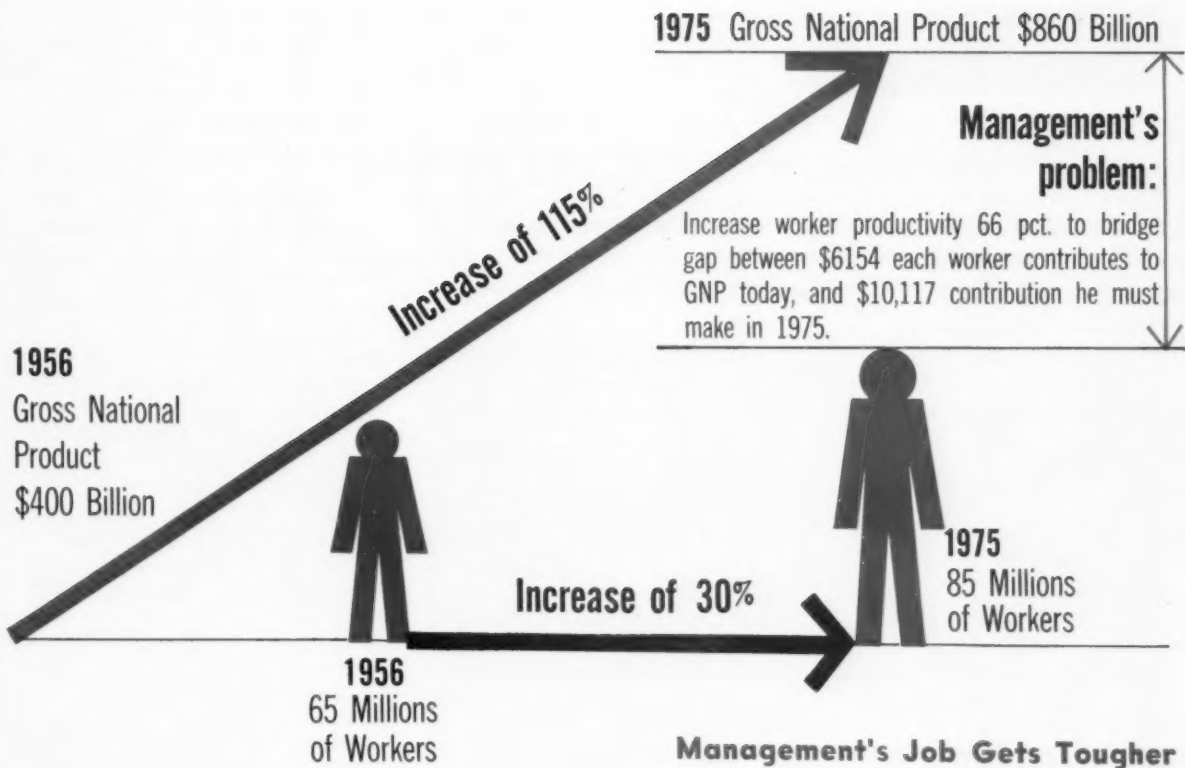
Why Management Consultants Are Busy

■ **Handling large numbers of employees, coping with the new tempo of technical change, and meeting the insistent demands of both stockholders and employees for a larger slice of earnings have added tremendously to the complexities of decision making.**

As a result, management consultants are not only called in more frequently, but their advice is sought increasingly now on the broad, long-term problems of business rather than merely to help solve small crises that develop in small units.

A recent survey by the Assn. of Consulting Management Engineers indicates that gross annual billings for management consulting firms in this country currently top \$400 million. The job of the consultant is being importantly influenced and changed by the rapid growth of all kinds of businesses during and since the war.

Not only has the number of businesses increased more than one million in the last 10 years, but the size of individual units has been increasing dramatically since well before the war.



terprise into a smoothly articulated whole. In the last 20 years, there is hardly a business which hasn't seen the number of its employees increase substantially, often twofold or more.

Though output has been vastly increased, markets enlarged, and product lines expanded, new responsibilities in most companies have simply been added to those already carried by the top management team.

The consequence is too few executives are spreading their time too thinly in trying to supervise too many people. The problem then is what to do to arrange our people and their talents to best advantage.

Get Opinions

In making do with what we have at hand, we reverse the classical organizing concept and start with an analysis of our available human material. We should not abandon long established organizational engineering concepts, but they now must become secondary to people.

In addition, it is essential under these conditions of management shortage to find the strengths and build around them. Almost every business has more skills and strengths than it realizes. Now is the time to recognize and make the most of them.

Another trick helps build a solid organization structure. Beginning at the top, find out from each executive his idea of what (a) the company's objectives are, (b) what his share of the over-all responsibility and authority is, (c) what keeps him from doing better than he does, and finally, (d) what's wrong with the whole works that should be corrected.

This process of self-analysis has the healthy effect of bringing into the open some sound criticisms of company operations, exposing areas of over-lapping operations, and—perhaps most important—developing a feeling of responsibility on the part of each executive to measure his own performance realistically.

Of course, it is unwise for the long pull to continue the expedi-

ent of "building jobs around people" rather than "building people to fit the job profile." Such compromises are considerably more justifiable with long experienced, older personnel than with younger people.

Now Hear This

(4) The next move is clearing the channels of communication and setting up methods to ensure that the inspiration of an idea at the top carries on down to the last link in the chain of command, unblemished in the journey. This is not easy.

Many presidents have been shocked to learn what the lower managerial echelons actually think the company's ambitions, policies, and ethics are and they sometimes discover with a start their subordinates' evaluation of the soundness of the company's programs.

Where the program of communication upward as well as downward is faulty, these opinions are seldom complimentary. Resulting misunderstanding slows up the whole management process and is

a major factor in making killers of the jobs at the top.

There is no substitute for repeated, comprehensive written communication in any company, always supplemented by concurrent and subsequent expository group discussions. There is no better place to apply the preacher's method of first telling them what you are going to tell them, then tell them, and then tell them what you told them, especially on important policy and procedural matters.

Be Specific

(5) Tomorrow's executive is going to have to learn his business on the job. To do this effectively, he needs the opportunity to share daily in the decision-making process—even though he starts on a low administrative level. He should be given specific responsibilities, and made to account for his handling of them. His long-range chances for promotion should be pointed out to him so he can develop special skills in off-the-job study courses. His efforts in this direction provide a valuable measure of both his initiative and his ambition.

One part of the solution is a

periodic appraisal of his development by his superior so that any wrong moves he may have made can be corrected but, more importantly, so that he knows the boss is watching him and is interested in his progress. Also, this appraisal program is the means by which management checks the results of its investment in executive development.

(6) Every executive in these times learns and re-learns the effect upon his financial welfare of income taxes each time his gross income is increased. At the upper management levels, the toll of the income tax is such that it may be truly said that "man toils not for bread alone." Deferred income in its various forms and profit sharing incentive plans aim at solving these monetary problems.

However, there are other means of recognition, not necessarily monetary, that are important also. For example, each supervisor should not only have a clear understanding of his responsibility, but he should be kept informed at regular intervals as to just how he is doing in carrying out his share of the company over-all program; he should be given the information from which he, himself, can measure his achievement and take pride in a job well done.

The problem is to develop ways and means of answering, all the way down the chain of command,

the logical and proper and human question of "How am I doing?". Not all of these queries are answerable completely, if at all, in financial terms. Some are best handled in units of production, and comparisons to standards as to various factors such as material realization, direct and indirect labor, inventory turnover, average sales price per unit and a score of other criteria which aren't necessarily related to immediate financial reward.

In this last fundamental of getting more mileage from management is involved a highly technical and comprehensive problem of forecasting, budgeting and control, and beyond this, communication. It's a difficult problem to solve, but since it comprehends the checking and evaluation of all that has gone before, it is well worth concentration of executive time and effort upon it.

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Chrysler Streamlines

Chrysler Corp. continues to reorganize its departments on a streamlined basis. The latest step, the third in recent years, establishes a 19-plant stamping and manufacturing group.

The new group includes the facilities of the automotive body div. which was formed from plants purchased from Briggs Mfg. Co. in 1953.

L. L. Colbert, Chrysler president, says the latest step is in keeping with the corporation's object of improving cost, profit and efficiency.

The new group is comprised of two divisions; the stamping div. and parts and equipment manufacturing div. The stamping div. will handle sheet metal operations, die making and welding techniques. The parts and equipment manufacturing div. will produce such things as brightwork trim items, chassis parts, steering linkages and suspensions.

Walter J. Semlow On Communications:

"One of the greatest obstacles to effective management development is faulty communications within a company."

♦ "I recall the shock that a friend of mine had recently. He was the manufacturer of a small mechanical device which the firm had sold successfully for many years.

"Finally, to meet rapidly expanding demand, the business moved from a one-story factory to a new, multi-story building in a new location. As a friendly gesture, the management staged a series of house-warmings for em-

ployees and their families and showed cutaway models of their completely assembled product.

"The shock came when several of the employees who had worked for the company for 20-30 years came to the president to say how pleased they were to have seen, for the first time in the cutaway model, just where the component they made fitted into the company's product."

STEEL: The Bears Are on the Prowl

Institute meeting finds bears outnumbering bulls . . . But producers are not so worried that they are looking for foreign business . . . Head of Inland Steel calls for new labor approach, longer contract.

◆ **STEEL PRODUCERS** as a whole have a bearish outlook for third quarter business. But this sentiment is by no means unanimous. At the sixty-fourth general meeting of American Iron and Steel Institute in New York, the bears could be separated from the bulls on the basis of product mix. Producers heavy on plates, structurals, and oil country goods evidenced a much brighter frame of mind.

Overlooked in all the corridor talk of a letdown was the fact that steel people apparently are not pessimistic enough over domestic business to make heavy commitments on foreign orders which have been kicking around the country for months. The reason: The mills don't want to tie themselves up with foreign business should conditions in the U. S. reverse themselves.

While no one was willing to talk for the record on the probable outcome of labor negotiations, two points were evident: (1) A stiffening attitude toward granting an expensive package, and (2) a pessimistic frame of mind on the chances of a peaceful settlement should the steel union persist in some of its demands, particularly that of premium pay for weekend work.

Other topics discussed by steel leaders were price trends and expansion — and how to pay for it.

Joseph L. Block, Inland Steel Co. president, called for long-range labor peace in steel. He said that steel labor and management must find a way to avoid the annual crises that have marked the last 20 "hectic" years in their relations. Mr. Block advocated a contract which "will be firm for a period of years and still be equitable to both parties. Other industries have done this."



AISI MEDAL was awarded W. T. Rogers, right, product engineer, Lorain Works, National Tube Div. U. S. Steel. Benjamin F. Fairless, AISI president, presents the award to Mr. Rogers at 64th Institute meeting.

He urged both labor and management to recognize the true identity of their objectives, and attacked strikes as a method of settling differences. Instead of hoping to settle somewhere in between an empty offer by management and extravagant demand by labor, Mr. Block pointed out, there is a relatively narrow area in which bargaining on economic issues should take place.

Fairless Speaks

Expansion and the related problems of depreciation were highlighted in an address by Institute president Benjamin F. Fairless. Mr. Fairless told his audience that the nation's steel industry will have to spend \$1.1 to \$1.5 billion in each of the next five years merely to replace obsolescent facilities, but under existing tax laws depreciation allowances will

fall about \$3 billion short of doing the job.

The institute's board of directors re-elected for another year the current officers of the institute and elected two new directors, E. J. Hanley, president, Allegheny Ludlum Steel Corp., and Max D. Howell, executive vice-president of the institute. Resignation of one former director—H. G. Batcheller, chairman, Allegheny Ludlum—was announced.

The American Iron and Steel Institute Medal was awarded to W. T. Rogers, product engineer, Lorain Works, National Tube Div., U. S. Steel, and the Regional Technical Meeting Award to A. F. Sprankle, metallurgical engineer, Steel & Tube Div., The Timken Roller Bearing Co. No Gary Medal was awarded this year.

The Schwab Memorial Lecture was given by Arthur E. Compton.

INVENTORIES: Big But Out-of-Balance

Stories of 60-90 days of inventory are misleading . . . Plates and other products are still short . . . Even brief strike would hurt consumers to some extent . . . Tonnage is high, but balance is very poor.

♦ **INDUSTRY** is walking a fine line between a changing steel market and the combined threat of a steel strike and higher steel prices.

Just emerging from over a year of the tightest possible steel market (which is still very much in evidence on many products and special items), most steel users have top heavy inventories, large in tonnage but far out of balance.

Inventories are a serious matter to industry, producer and consumer alike. Steel users know that tough labor negotiations lie ahead, want to know how long their stocks can hold out if a serious steel strike materializes.

Steelmakers, already somewhat concerned over third quarter and later demand, are worried about the prospect of excessive inventories developing that could result in cutbacks in steel buying after the labor settlement.

Record Level

Inventories of steel in consumers' hands have been rising steadily this year, are now at record heights.

It's estimated that shipments of steel have been exceeding consumption by about 10 pct since the first of the year. This has built inventory at the rate of 750,000 to 800,000 tons a month. By the end of the first half, inventories of steel will be at a peak of 21.5 million tons—a full three months supply for all industry.

This 21.5 million-ton figure is not to be confused with steel mill inventories. It is steel (including warehouse stocks) that has left steel mill shipping docks but has not left plants that fabricate it into finished products. The comparable '53 and '54 estimates (see chart, right) are as of the end of the third quarter.

Current year has seen steel inventory increase $2\frac{1}{2}$ million tons in the first quarter, with an equal rise in line for the second. What will happen to steel orders then, assuming there is no strike?

But if there is a steel strike, how well is industry situated? How long could production in important industries be maintained if labor talks become deadlocked?

Two Weeks Hurts

It's true that most metalworking firms have from two to three months of steel inventory. It's also misleading. Even the largest consumers suffer from unbalanced inventory. Smaller consumers, many frozen out in the rough and tumble competition for steel, have not been able to build up inventories to the point of standing up to a strike of more than a few weeks or a month. Even a two weeks strike would hit hard at more than 50 pct of the steel using industries.

The inventory situation must be described in terms of both industry and product. No rule of thumb exists except on a few categories.

Probably the tightest steel inventory situation in the economy is in oil country goods. A representative spokesman says that "there simply is no inventory in that field now . . . mills are at capacity and booked for the foreseeable future. Programs in progress are far beyond any visible supply of casing, tubing and line pipe. A good many are being scaled down. . . . In the event of a strike, the whole program would be brought to a standstill in short order."

From this extreme, the picture gradually eases to those industries, like farm equipment or auto-

motive suppliers, which could operate for 60 days in case of a steel shutdown.

Plate Tightest

Continued tightness of plate affects rail car builders, tank fabricators construction equipment builders, and structural fabricators. Plate inventories here have not been accumulated to more than half "normal" inventory.

Generally, plate inventories range from no days, where it comes right off the car to the job, up to a high of 30 days. Plate



INVENTORIES of steel in most industries feel the pinch of out-of-balance stocks. Plates like these are a "precious metal" to many users. Other products range from scarce to plentiful in representative areas.

users are also caught by a four to five week carryover that is not easing, may be getting worse.

Smaller users of plate, like materials handling equipment, are in better position. Farm equipment makers have been able to get perhaps 60 days ahead.

30 Days for Cars

Automobile producers are in relatively good shape since their inventories generally are at maximum levels. But because of the vast tonnages used, and problems of storage and age-hardening of cold-rolled products, these are relatively small in terms of days production.

General Motors, it's reported, has authorized and on hand the maximum of 35 days operating steel. This again is misleading, but in different respects. The auto-industry can frequently trade, borrow or buy steel to stretch inventories beyond the day level. However, a strike would empty

pipelines, which take more than a few days to fill to normal flow of steel after a shutdown ends.

There is no doubt but that the auto industry, despite its usual success in getting steel if it's available, has out-of-balance stocks.

Related directly to the auto industry, cold-finished sheet and strip inventories are also high in appliance, farm equipment and even warehouses. Automotive buyers are not now accepting full quota of either cold or hot-rolled sheet.

This is partly inventory control, partly to balance supplies against the end of 1956 model run and beginning of the 1957 model season. In any event, mills are current on delivery of cold-rolled, nearly so on hot-rolled.

Railroads Suffer

After oil country, railroad car builders and railroads themselves are in the tightest inventory squeeze. The current heavy build-

ing program is based on plates, carbon bars and structurals. Car-building schedules are predicated on steel deliveries so a steel strike would result in fast curtailments due to lack of inventory.

The construction industry is generally in good shape, because of seasonal factors which require building up best stocks in advance of the summer building season. But this is not true in all products, and tightness of plate, wide flange beams and other tight structurals would hurt in a short time. With cutbacks in sheet production, plate situation could ease, however.

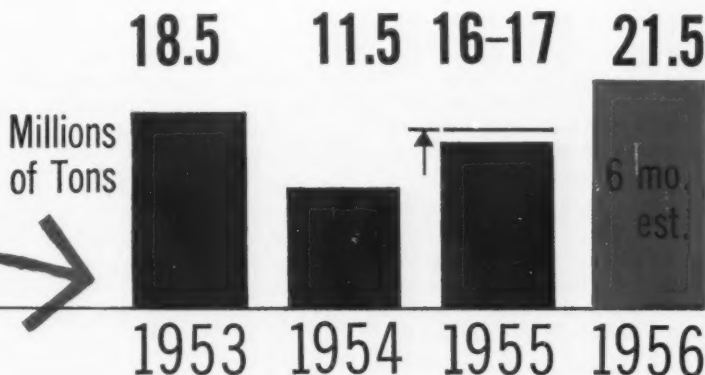
Appliances Safe

Appliance makers, who have continued to carry the ball in steel buying, are in about as good condition to weather steel trouble as any. Few of the steel products used are in tight supply. However, one of the major appliance companies admits concern over

Steel Inventories: Feast and Famine

Industry sources put inventories of steel and finished products made of steel at all-time high.*

*Steel that has left shipping docks at steel mills but has not yet left shipping docks at places where it is made into finished products. Includes warehouse stocks.



**And
Some industries seem
to be sitting pretty**

**But
Others are starving**

A Common Problem

AUTOMOTIVE—Enough to make 400,000 cars and trucks
CANNERS—Double normal size
APPLIANCES—Generally fair, but some running only two weeks

OIL & GAS—Practically none
FREIGHT CARS—Hand-to-mouth
RAILROAD—Poor

CONSTRUCTION—Hard up for plate and structurals
Imbalance in hard-to-get structurals, plate. Also HR bars

inventory situation of component parts makers.

This is another of the intangibles that can't be forecast with complete accuracy. In many cases, the parts user can help out a supplier, and frequently has in the past. However, there have been cases of major shutdowns because of inability of a supplier to deliver key parts.

Warehouse Picture

The warehouse picture may give a clue to general off balance of industry. They are in fair shape except for plates, structurals and some bars (which are spotty industry-wide and hard to generalize). And in spite of general feeling of easing in the market, warehousemen complain they can't get all the steel they would like.

While some of the industry inventory building may be stimulated by the certainty of price hikes later, there is little evidence of abnormal inventory accumulation anywhere. Any hedging is against the strike danger, not prices.

Price Not a Factor

And there are always the rumblings that "steel would welcome a short strike," or (and this is frequently heard), that the auto industry would be willing to take one to stimulate auto sales and to cut back its inventories of cars in dealer hands.

But this is not the case. A strike of any duration is both expensive and demoralizing to any industry. Its after effects linger on for months. And a consumer, regardless of his own sales position, doesn't want to return to scrambling to get its materials for production.

A one-month shutdown would knock out 6 million tons of steel shipments. That's hard to replace anywhere.

Jet Trainer Planned

Contract for a supersonic jet trainer has been awarded by the U. S. Air Force to Northrop Aircraft, Inc. Air Force declared that on completion of contract they will have a "pure" jet trainer for the first time.

MANAGEMENT

BENEFITS: At Breaking Point?

Fringe costs to metal stamping industry will be higher this year, PMI says . . . Incentive plans growing in popularity but rest periods big cost item . . . Employees should cooperate.

♦ **COST** of fringe benefits in metalworking continue to climb.

In the past year, cost of extras in paychecks climbed more than two cents per hour in its own segment of industry, a survey of the Pressed Metal Institute shows.

Total fringe benefits in the stamping industry are equal to 40.5¢ per hour and total cost in 1956 to the industry will be more than \$100 million, the survey shows.

Of nine districts surveyed in the Midwest, East and New England, Toledo reported the highest fringe benefit load of 57.9¢ per hour. The second ranking district—far behind Toledo—was the Ohio River Valley with 46.3¢.

All companies polled in the survey had an unemployment compensation plan, most had such benefits as workmen's compensation, paid holidays, insurance plans, paid vacations and old age and survivors benefits. But few had cost of living scales, credit unions, severance or National Guard and jury duty pay. Twenty-two fringe benefits were listed.

Weighted averages show that rest periods are the largest expense item in the fringe. They cost the average company 7.4¢ an hour. Vacation pay is second with 6.7¢ and profit sharing plans third at 6.6¢. These three categories total 20.7¢, or approximately half of the total fringe benefit outlay. The remaining 19 categories account for the other half.

Considering the tremendous financial load of fringe benefit expenditures, PMI recommended that management and labor take more time to examine and appreciate each other's problems.

Work Together

Reduction of waste and spoilage to a minimum and the delivery of an hour's intelligent production for each hour's pay would place management in a position to meet these and other obligations with a "feeling of satisfaction."

In order to get this feeling of satisfaction across to employees, more companies are adopting motivating fringe benefits such as bonuses and profit sharing plans.

What Fringe Benefits Cost Stampers

District	Total Manhours	Av. Cost per Productive Hour	Av. No. Employees	Av. Annual Cost per Employee
Milwaukee	1,589,531	\$0.3021	671	\$716
Chicago	2,682,890	.3885	1303	800
Michigan	2,759,978	.3874	1322	809
Toledo	1,338,362	.5787	725	1068
Northeastern Ohio	2,890,778	.3841	1421	781
Ohio River Valley	1,048,747	.4634	562	865
Niagara Valley	1,660,387	.3574	854	695
Middle Atlantic	786,808	.3183	394	636
New England	7,836,539	.4293	3966	848
Total	22,594,020	.4058	11,218	817

Source: Pressed Metal Institute.

ACCIDENTS: Prevention Starts at Home

Washington parley looks homeward for answers to rising industrial accident rate . . . Campaign strategy mapped by Secretaries Mitchell, Benson and an Oregon housewife . . . Wives, clergymen asked to cooperate.

♦ **INDUSTRIAL SAFETY** — like charity—should begin at home.

Alarmed by a 4 pct increase in industrial accidents in 1955, the U. S. Dept. of Labor wracked its official brains, came up with several untried avenues of accident prevention at the President's Conference on Occupational Safety.

Among them: put the weaker sex to work. The theory: women will expound safety at the breakfast table, will learn to understand that domestic squabbles, etc., have an effect on her husband's safety consciousness.

Happiness At Stake

Clergymen also were enlisted in the campaign to curtail accidents. Although they had no formal role in the Conference, their presence was assurance that safety talk would be forthcoming from some pulpits soon.

Mrs. George H. Buckner, a Portland, Ore., housewife whose avocation is accident prevention, told the 3200 delegates that a man who goes to work in the morning after arguing with his wife is more accident-prone than one who leaves the house happy.

"Sir Galahad didn't fall off his horse, he was pushed off," Mrs. Buckner said. Although there are 20 million women in industry, still another 40 million are dependent entirely for their future happiness upon one person . . . their husbands.

"A reduction of industrial accidents means increased security to women," she continued. "Last year there were nearly two million occupational accidents reported in the U. S. More than 12,000 of these resulted in death. That's a lot of husbands lost, a lot of grief and chaos for their families.

"Women are by nature more cautious than men," Mrs. Buckner added, "but most women are confused and ill at ease with industrial procedures. Give us some technical training. Teach us how to help you," she urged of the delegates.

Junior a Target

Her plan: wives be invited to company safety rallies, be sent safety newsletters; safety engineers be invited frequently to speak at women's clubs, community meetings, state and regional conferences.

"Believe me, a woman's tongue will keep safety talk going at home day in and day out," she said. Readyng the younger generation for safety in future jobs is another important function of women. Good, early training will have its dividends.

Especially well represented among the clergymen were the Catholic and Jewish faiths. Secretary of Labor Mitchell, conference chairman, expressed hope that more men of the cloth would campaign actively for a reduction of accidents.

Farmers, too, were expected to benefit by this coaching from the kitchen and pulpit. Ezra Taft Benson, Secretary of Agriculture, urged a reduction of the 310,000 disabling injuries that occurred last year on farms in the U. S.

Mitchell Speaks

The basic problem, according to Secretary Mitchell, was "finding the elusive something in the well-springs of human motivation that makes a man take care of his own safety and that of others."

The answer remains to be found.

How to Cut Your Accident Rate

■ Although U. S. industrial accident rate went up throughout the U. S. in 1955, individual companies were able to keep their rate down.

■ Here's the steps Eastern Malleable Iron Co., Wilmington, Del., followed to go through 1,778,253 man hours in 1954, 1955 and to date in 1956 without a single lost time injury.

1. Used ordinary safety methods, but exerted extraordinary effort.
2. Safety rules and safety equipment wearing strictly enforced.
3. Constant education through plant publication, posters, scoreboards and accident bulletins.
4. Orientation of new employees and frequent discussion between foremen and management.
5. Improve housekeeping, detailed accident reporting, on the spot investigations.
6. Active participation by top management.

CHEMICALS: Coke Products Show Gain

Good markets, attractive prices encourage steel plants to increase production of xylene, toluene and benzene . . . But output is limited to rate of mill operations.

◆ COKE CHEMICALS are moving up in sales importance. A rise in steel plant output of xylene of 2,000,000 gal annually by 1960 is forecast by Universal Oil Products Co., a Chicago firm specializing in techniques for production of chemicals from petroleum. Toluene, another important coke plant byproduct, will move from 36,000,000 gal in 1954 to 48,000,000 gal in 1960. Benzene, third of the major coke volatiles produced by steel mill coke ovens, will advance from 163,000,000 gal in 1954 to 250,000,000 gal in 1960.

The advance looks good. But the oil industry, another producer of the same products, is doing much better. Oil industry output of benzene for sale has risen from about 10,000,000 gal annually in 1950 to a projected 470,000,000 gal by 1960. The petroleum producers have produced more xylene

and toluene than the steel industry for a number of years, but even here their margin of total sales volume seems to be increasing.

Varied Uses

It's a market worth study. Benzene, though once regarded as a kind of super hotrod fuel, has a fairly stable market base, going chiefly to the growing plastics industry and into synthetic rubber, nylon, aniline dyes, detergents, and insecticides, in about that order. Toluene has its number one market in solvents, but is used in aviation gasoline, explosives, synthetic rubber, emulsion paints, and plastics. Again, in about that order of volume. Xylene is sold to producers of solvents, aviation gasoline, plastics, synthetic rubber, and synthetic fibers such as dacron.

It's not odd that a producer of oil refining processes is watching steel mills as a potential market for chemical refining equipment. Despite the heavy investments by steel in coke oven chemical recovery equipment in the past decade, there's the hint of more business on the wind. For instance, Universal Oil Products has marketed its Udex process for separating xylene, benzene and toluene from non-aromatic hydrocarbons in the oil refining industry.

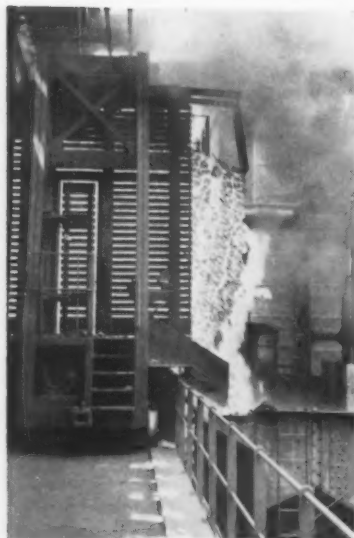
With present equipment, most steel companies have about 1-3 pct of these unwanted hydrocarbons remaining in the three volatiles at market time. Petroleum refiners, using Udex, can produce volatiles with non-aromatic content as low as 0.1 pct. Since 1952 consumers have become aware of the growing availability of these purer volatiles, and it is one of the reasons, though not the major one, that refiners have often been able to command a premium price for their product.

Another process that is already in action in the oil refineries is hydrodesulfurization, which is either on the way or already obtainable for application to coke oven produced light oils. Such equipment can boost xylene recovery, according to one source, by as much as 15 pct through recovery of material now lost in acid sludges. At least some gains in toluene and benzene recovery seem likely as well.

Prices Increase

The price advance on benzene, toluene, and xylene is indicative of their growing importance, and suggests another reason for Universal Oil Products' interest in steel's reaction to growing petro-

Coke Chemicals: Where They Go



Coke by-products constitute a wide variety of different items in demand in a wide variety of industries. Some of the major products, along with the markets they serve are: (1) Benzene, a vital commodity in the production of plastics, synthetic rubber, nylon, dyes and pigments, detergents, and insecticides; (2) Toluene, one of the most popular solvents used by industry, considered invaluable for production of aviation gasoline, some explosives, emulsion paints, plastics and synthetic rubber; (3) Xylene, another solvent of immeasurable value to certain industries, like its kin contributes heavily in processes for manufacturing plastics, aviation gasoline, synthetic rubber, and certain man-made fibers.

leum industry sales of the three products. In 1950 petroleum refiners received about 23¢ per gal for toluene. Currently the price is holding steady at about 34¢ per gal. Benzene has gone off 1¢ per gal this year, but has risen from 38¢ to as high as 52¢ in 1953, is currently running at 37¢ per gal. Xylene is another riser, has gone from 23¢ per gal in 1950 to 34¢ per gal in 1956. These are average prices received by the petroleum industry and do not represent top price levels.

Tied to Operations

One thing that steel mills can't lick in the volatile picture is the fact that their output of coke oven byproducts is tied closely to the operating rate. It's felt by many chemical buyers that the petroleum industry offers a more constant source of supply. In the past, apparently for this reason as much as for the higher purity of the product, chemical buyers have often paid premium prices for petroleum produced benzene.

But steel mills can get greater recovery with new equipment, can obtain the highest quality output demanded in today's market. The investment cost could range from a very low \$500,000 up to \$3,000,000 depending on the size of the plant desired and the number of processes included—but it's a safe bet that steel mills are already interested and that some will take the plunge in the not too distant future.

Research Expanded

Le Roi Div., Westinghouse Air Brake Co., Milwaukee, indicates it will expand its engineering and research facilities at a cost of about \$5.5 million.

A half-million dollars has already been accounted for in construction of new laboratory facilities. Balance of the appropriation will be spent within the next 5 years.

Engineering personnel will be doubled during 1956 as part of the project.

The quality control department is currently undergoing reorganization and expansion.



PILOT of this L-17 takes aerial photos, or projects the situation via closed circuit television camera, yet never leaves the ground. Developed for the U. S. Army Signal Corps by Temco Aircraft Corp., the ground control system weighs only 250 lb and can be transported easily by jeep.

Television:

Airborne TV developed for jet reconnaissance

An airborne TV system which may be used in jet aircraft reconnaissance work has been developed by Philco Corp.

A complete, self-contained, broadcasting station, the system can provide ground control points with an active picture of troop movements or terrain. With its use, a TV picture can be transmitted, not only from near ground level, but from the stratosphere, beyond reach of antiaircraft gun fire.

To cover a wide area, two unmanned, studio-quality TV cameras are used in the plane. Signals are transmitted to a ground control point where they are picked up by a receiver. There the picture may be instantaneously photographed on 35mm film which may be processed immediately.

The picture can be projected on theater-size screens at the control point or relayed to other locations. In addition, pickups from slower-moving aircraft may be observed, live, on standard fine-line monitors.

Navy Tests Rocket

Successful field testing has been completed by the Navy of its high-speed rocket, the ASP, designed for studies of the upper atmosphere.

The rocket—named from its initials Atmosphere Sounding Projectile—was constructed from planning to flight in less than five months. It was developed and built by Horning-Cooper, Inc., Monrovia, Calif., under contract with the Bureau of Ships.

The ASP is a small unit powered by a solid-propellant rocket motor. It may be directed vertically to attain high altitudes or horizontally to achieve long range.

EXPANSION IN INDUSTRY

Kaiser:

**Boost Fontana output
40 pct; Cost \$113 million**

Kaiser Steel Corp. will invest \$113 million to boost ingot and finished steel capacity of its Fontana, Calif., plant by about 40 pct. This will make new capacity about 1.528 million tons per year.

Although scheduled for immediate commencement the project will not be completed for about 2 years. However, since new facilities will be put into operation as they are completed, current capacity of 1.084 million tons will be increased gradually over the period.

Program will include installation of an oxygen steelmaking plant, a slabbing mill and other equipment aimed at boosting output of hot strip, plate and tin mills.

Oxygen New Development

New oxygen steelmaking plant will be the first of its kind in the West; only the third in the entire country. In the process, oxygen is blown across the top of vessels

containing molten pig or scrap. Oxygen steel is considered equivalent in quality to open hearth steel. Kaiser considered advantages of this method to be low initial investment, high production rate and low operating costs.

Kaiser will borrow \$100 million of the necessary funds from institutional investors.

More Vacuum Melting

A planned expansion of Allegheny Ludlum Steel Corp.'s vacuum remelting department will increase capacity to 1.5 million lb per month by the end of 1956. This will double capacity.

Plant is located in Watervliet, N. Y. A new two-unit melting furnace has just recently been built.

Move is attributed to a high volume of orders for alloys used in jet aircraft engines. The vacuum process gives high degree of purity in steel alloys. It has been used primarily to produce the high temperature superalloys, which have been in growing demand as jet engine speeds increased.

Allegheny Ludlum, in its process, remelts a consumable electrode in a vacuum.

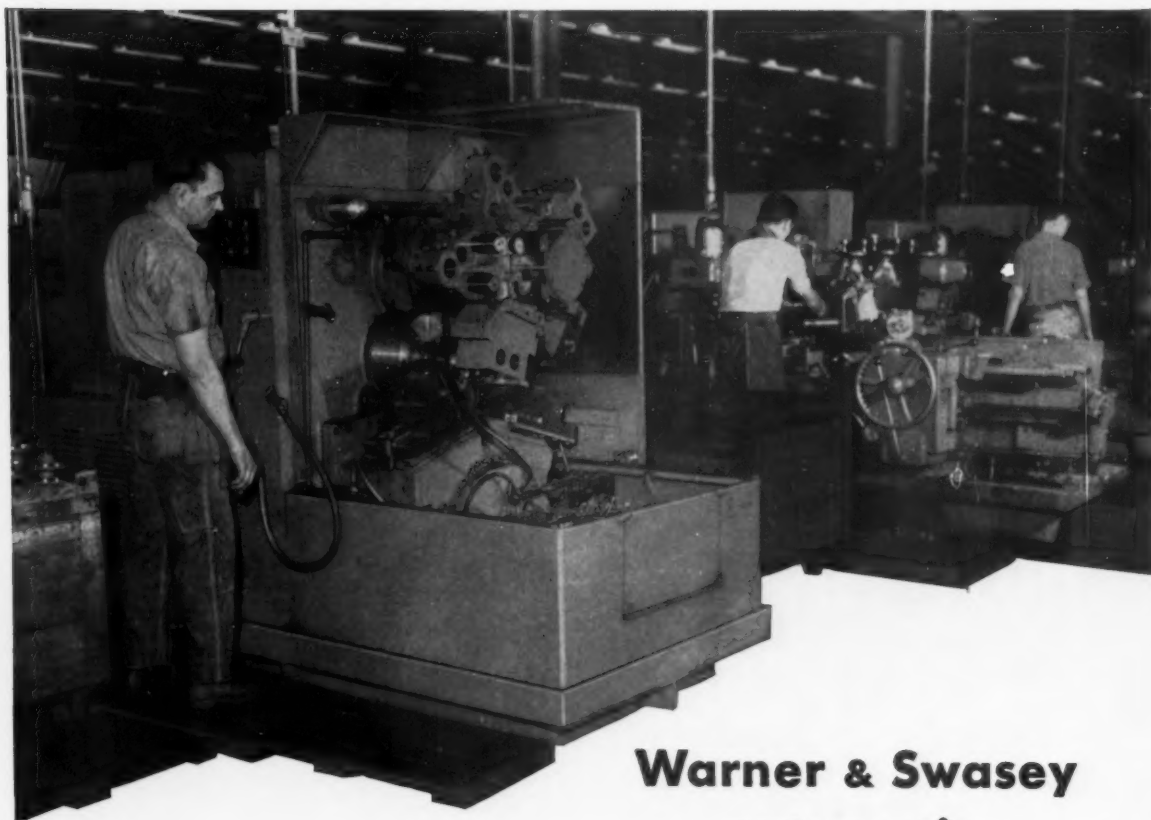


H. STAFFORD KELLAM, purchasing agent, Trumbull Components Dept., General Electric Corp., Plainville, Conn., is the new president of the National Association of Purchasing Agents. Purchasers met in Cleveland last week. Cost reduction was a big problem of discussion.



Big Wind

Machinery and equipment seem to be getting more "human" every year. New wind tunnel of the National Advisory Committee for Aeronautics at Lewis Flight Propulsion Lab, Cleveland, is not only the world's most powerful, with seven motors delivering 250,000 hp, but also has a built-in throat which expands or contracts by means of jacks, to vary airspeed while tunnel is operating. "Bird cage" is actually screened inlet of compressor, while king-sized fan is main compressor delivering 2000 lb of air per second.



Warner & Swasey automatics

slash machining time on 50 to 350 piece lots

THE YALE & TOWNE MANUFACTURING COMPANY, Philadelphia, machine 64,000 different parts, on a two-month cycle, for their five models of industrial lift trucks. They installed two Warner & Swasey 2 AC Single Spindle Automatics to step up production on a wide variety of small lot parts. Lot sizes range from 50 to 350 pieces.

They quickly realized the expected production increase, plus more efficient use of manpower, since one operator can easily handle both automatics.

They selected Warner & Swasey 2 AC's for the job be-

cause these machines give them the advantage of automatic production *without* the usual penalties of greatly increased setup time. Their setup time is just a small fraction more than on turret lathes.

"Another big advantage we had not fully anticipated," they report, "is the interchangeability of tools. The very accessible tooling area and the use of many standard turret lathe tools are valuable features of these automatics."

There are undoubtedly many small lot, "turret lathe" jobs in your own plant that could be

machined faster, more profitably and with extreme accuracy on Warner & Swasey Single Spindle Automatics. Have your Warner & Swasey Field Representative show you how these machines' flexibility and fast setup can pay off for you.

**WARNER
&
SWASEY**

Cleveland

PRECISION
MACHINERY
SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

May 31, 1956

HOW TO RUSTPROOF BLACK PLATE



Rust is a problem anytime, but it's particularly serious with black plate. On this light gauge, dry, uncoated steel, rust can start from a fingerprint. "Sweating" due to sharp temperature changes will cause immediate rusting on surfaces and edges.

Leading mills are now eliminating rust problems by packaging black plate in Ferro-Pak, Cromwell's volatile corrosion inhibitor paper. Chemical vapors from Ferro-Pak form an invisible film around the steel that prevents rust from getting a start, even when moisture is present.

The new Ferro-Pak sheet above was custom-made by

Cromwell's "Paper Engineers" to meet steel mill requirements for shipping black plate and dry sheet steel. It is water-proof, strong, yet highly flexible and easy to handle. Its chemical rust inhibitor is non-toxic . . . compatible with oil . . . stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write **Cromwell Paper Company, 4803 South Whipple St., Chicago 32, Illinois.**

FERRO-PAK® by Cromwell

"Paper Engineers"



RUSTPROOFING A FREIGHT CAR. Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.

REPORT TO MANAGEMENT

The Changing Economic Pattern

There's nothing in the record yet to justify dire predictions of things to come. First quarter figures of the Dept. of Commerce show that wages and salaries are up, gross national product continues to climb, and personal spending is still on the upgrade.

But the pattern of spending shows a marked change, throws significant light on what's been going on, why there are shouts of danger ahead despite general smooth going. It also shows that everything need not hinge on the auto industry, important as it is.

The record shows that spending for new cars and new homes declined \$2.5 billion (on an annual rate) from fourth quarter '55 to first quarter of this year. This continued the decline of \$3 billion from third to fourth quarter last year.

On the other hand, business spending for new producers' equipment continued its steady climb that started early last year and has been one of the strongest factors in the economy.

It has been the stopper in preventing what could have been a general decline in business following the downtrend in auto and home buying.

Rate for the first quarter was \$27 billion annually, \$1.5 billion higher than the last quarter of 1955 and \$5 billion higher than the first quarter a year ago.

When you compare the first quarter rate for automotive and parts spending of \$14.6 billion, with the \$27 billion (and still climbing) rate for producers' durables equipment, you can readily see what's holding up the economy.

It's also obvious that this rate of spending, which depends so

much on business confidence, should be maintained if a serious downturn is to be avoided.

Will Taxes Ever Come Down?

About 10 months ago, it was predicted here that a balanced budget for this year was in sight and that both individual and business tax reductions were possible.

In the intervening time, it became obvious that increased income, resulting in higher tax returns, would bring a balanced budget within reach. But the possibility of a tax cut became less and less.

Only increased defense spending kept tax cuts from becoming the next order of business. But the fact remains that government tax receipts were well over estimates, but still failed to result in enough surplus to justify any real pressure for cuts. With more and more emphasis on the really expensive weapons to fight the cold war, significant tax reductions may be years away.

Look at the Tax Structure

Pressure is building up for a thorough overhauling of the entire tax structure. While such ideas as completely abolishing the income tax are far-fetched, there is no doubt but that the general public is fed up with present laws.

It isn't just the high rates that cause the potential rebellion. General feeling is that the laws have resulted in inequities at all levels. It's traditional for taxpayers to protest, but they demand fairness.

Congressional mail is indicative of present attitudes in all brackets of the tax structure. Whether it will result in a serious move to revamp the tax laws is very doubtful. It would be a job of such size and complexity that it defies undertaking.

INDUSTRIAL BRIEFS

Up, Up, and Away . . . Ford Motor Co. has formed a subsidiary to be known as Aeronutronics Systems, Inc., with headquarters in Calif. Purpose of the new group will be thorough investigation of advanced scientific and technological operations including guided missile systems and possible exploration of outer space.

Money Talks . . . Ninth Annual Southern Calif. Business Show, sponsored by the National Assn. of Cost Accountants, named Standard Steel Corp., Los Angeles, the most outstanding company in the show. Company officials believe a \$3 million increase in sales during 1955 played a big role in the selection.

Won't Float . . . Contract for the construction of a complete 3000 ton water-hydraulic extrusion press for use on brass and copper has been awarded by the Wolverine Tube Div., Calumet & Hecla, Inc. to Loewy-Hydropress Div., Baldwin - Lima - Hamilton. New installation will be major part of expansion program at Detroit plant of C & H.

A Toast . . . A suitably encribed Steuben glass vase was presented to retired vice president of industrial relations for Pittsburgh Steel Co. Garrett A. Connors by the Industrial Relations Committee, American Iron and Steel Institute. Gift was a token of appreciation for Mr. Connors' 19 years of service to the group.

Electronic Education . . . Concord Control, Inc. has been formed in Cambridge, Mass. New company will specialize in development and manufacture of numerical control equipment for machine tools and industrial processes.

Double Investment . . . Hitchiner Manufacturing Co., Milford, N. H., investment casting firm, is planning an expansion expected to double present steel casting capacity.

Then There Were 5 . . . Vickers Inc., Detroit, manufacturers of oil hydraulic equipment, has reorganized its engineering dept. New setup makes former department a division with five operating units, including industrial, automation and marine, ground mobile, airborne products—Detroit, and airborne products — El Segundo, Calif.

More Chiefs Than Indians . . . At the end of last year 819,000 people held stock in steel companies as compared with 768,000 at end of 1954, according to the American Iron and Steel Institute. Steel company owners now outnumber steel company employees.



"Of course that 'spaghetti' won't cook soft, . . . they're my welding electrodes!"

Two Sisters From Barium . . . Barium Steel Corp. has commissioned two newly acquired ore carriers for use in transporting iron ore from the company's mine in Dominican Republic. Both ships, M. S. Gladys and M. S. Alberta, have a capacity of 4500 tons of ore per trip.

No Bearing . . . Torrington Co., Torrington, Conn., has set up a new engineering dept. to handle problems of its specialties div. Previously, this function was handled by bearing engineering dept. of the company.

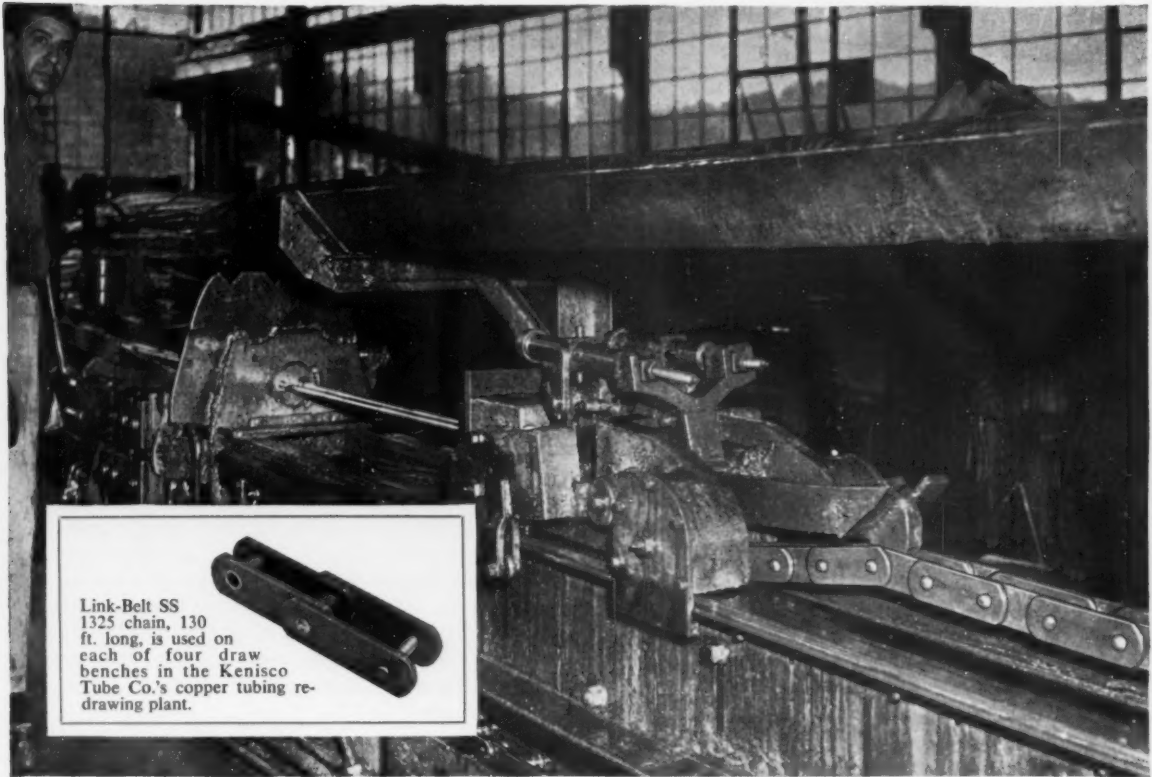
Stylists . . . Kaiser Aluminum & Chemical Corp. has organized a new industrial design section in its product development dept. New group will be responsible for styling involved in Kaiser's development of new aluminum applications.

High Finance . . . Borg-Warner Corp. has acquired the assets of Industrial Crane and Hoist Corp., Chicago, materials handling equipment manufacturer, through an exchange of Borg-Warner common stock.

Double Play . . . With less than 3 disabling injuries per each million man hours worked, employees of Westinghouse Electric Corp. enjoyed the safest year in company history, and won a total of 27 national safety awards.

Wheeling by . . . Wheelerweld is the new name of the Weldment Div. of the C. H. Wheeler Manufacturing Co., Ambler, Pa. Wheelerweld Division was known as the Cruse-Kemper Division, manufacturers of steam power plant condensers, pumps and marine auxiliary equipment.

Here's why so many of the nation's draw benches use LINK-BELT chain



Link-Belt SS 1325 chain, 130 ft. long, is used on each of four draw benches in the Kenisco Tube Co.'s copper tubing re-drawing plant.

Looking for the best chain
for a specific need?

LINK-BELT makes the complete line

Class H drag chain—
for drag conveyors, handling shavings or other refuse in runways or troughs.



Class C combination chain—popular, durable, low-cost design for elevators, conveyors.



LXS chain—particularly suitable for heavy-duty drive and conveying jobs.



Transfer chain with tilting dogs—
for plate and slab travel, loads up to 300,000 pounds.



LINK-BELT offers the chain that's best for every job

WHETHER it's for a 5000 or a 100,000-pound bench, Link-Belt draw bench chain is built to maintain close pitch and correct sprocket contact. Links are accurately machined after hardening by a special process that assures longer chain life.

Manufacturing refinements such as these are typical of every chain in the complete Link-Belt line. Accurate control of raw materials and manufacturing processes is your assurance of uniformity.

For complete information on chains and sprockets for draw bench or any drive or conveyor service, get in touch with your nearest Link-Belt office or authorized stock-carrying distributor.

LINK-BELT

CHAINS and SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

14-148



Automakers Beat Congress to Punch

Many dealer complaints have already been taken care of . . . New laws will have trouble in crowded Congressional agenda . . . GM's new dealer relations policies are taking effect—By T. L. Carry.

♦ SEN. JOSEPH C. O'MAHONEY, the dealer's friend, has just introduced a bill in Congress to give automobile dealers a day in court.

Idea behind the bill is to assure dealers of fair treatment at the hands of manufacturers. It is designed to stop, among other things, a manufacturer from arbitrarily revoking a dealer's franchise.

A companion bill, introduced by Sen. Mike Monroney, is aimed at curtailing bootlegging and factory coercion.

Despite the pressure that will be put on for passage of the measures this year, their chances of coming to a vote are extremely remote. Congress, which has been

dragging its feet to some extent, won't have time to consider anything but major legislation.

Changes Made . . . At the same time, factories saw which way the wind was blowing earlier this year and immediately set to work to eliminate what were admittedly some bad practices. To a great extent, manufacturers took care of most of the abuses these bills are aimed at.

General Motors Corp. set the pace by making radical changes in its dealer contracts. The move was followed quickly by other members of the industry. In addition, freight rates to various parts of the country were adjusted

in an effort to eliminate phantom freight.

One of the most important actions on GM's part was the appointment of Iven Wiles as executive vice president in charge of dealer relations. The object was to give the dealers a direct line of communication to top management.

The former general manager of Buick Div. has assumed the duties of his new post with alacrity. Just recently, he offered some interesting guideposts to dealers to show them how to survive the present rolling readjustment.

Dealers at Fault . . . Mr. Wiles points out that disappointing dealer profits are sometimes the

REDSTONE: Nation's Biggest Ballistic Missile



WHEN tail assembly at left, and nose at right, are joined by an approximately 60 ft long tube, the result is the Redstone guided missile, engineered and produced by Chrysler Corp. at its jet engine and missile div., north of Detroit. Redstone is a rugged ground-to-ground pro-



jectile which, with necessary firing equipment and personnel, can easily be transported by air, road, rail or water. Chrysler refers to unusual pre-assembly appearance of the nose as "an ice cream cone in a wagon wheel." Tail contains over 148,000 ft of wiring.

Plants improve plating operations with unique chromium process

♦ Operating costs cut, production stepped up by Unichrome SRHS® Chromium Plating Process

♦ Better plate also reported . . . many hundreds of plants now profiting

For years, many platers have had good opportunities to check results from ordinary chromium baths and from Unichrome SRHS Chromium. Here are just a few typical comparisons.

REJECTS MINIMIZED

At one company, intricate parts caused chromium plating coverage difficulties. On occasion, rejects due to the plate "missing" ran as high as 25%. Yet with SRHS Chromium and its wider bright plating range, work covered easily, with a reject rate under 0.4%. Foreman at another plant told of reducing rejects due to "burning" of the plate and eliminating color-buffing when the SRHS Bath was installed.

PRODUCTION BOOSTED

Unichrome SRHS Solutions increase plating speed. Work which took 3½ hours in ordinary chromium was done with SRHS in 2½ at one shop. Elsewhere, piston rings are being plated in half the former time.

Taking advantage of the higher efficiency of SRHS Chromium, some plants have obtained 30 to 66% more work per cycle from existing equipment, and saved power as well.

This process is just one of Metal & Thermit's many Unichrome processes and materials which provide opportunities to cut your finishing costs . . . opportunities to turn out a better product through a better finish. We'd welcome the chance to work with you.

Unichrome is a trade mark of Metal & Thermit.



PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
RADIOGRAPHIC EQUIPMENT
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP



METAL & THERMIT

CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY

Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium of Canada, Limited, Toronto



FAIRMOUNT GLASS WORKS, INC.,
INDIANAPOLIS, IND.

"We make combustion adjustments in minutes with the Cities Service Heat Prover!"

700 employees . . . 27 acres of plant facilities . . . and a yearly production of 288,000,000 bottles—that's Fairmount Glass Works at Indianapolis, Indiana, a beehive of activity where delays can't be tolerated.

So, when furnace combustion adjustments consistently caused as much as a day's delay and gave poor accuracy, Fairmount had to find something better fast! And they did . . . in the form of the Cities Service Heat Prover. This unique, portable testing instrument makes simultaneous readings of oxygen and combustibles, keeping a constant check on combustion conditions.

Thus, Fairmount's operators are now able to adjust the amount of combustion air to the amount and kind of gas being used . . . and they do it, port by port, in minutes!

In addition, the Heat Prover has proved virtually indispensable in shifting furnaces from producer gas to gas made outside the firm. Says Plant Superintendent Cedric C. Rau, "It's one of the most useful, versatile, and accurate instruments we've ever seen."

The Heat Prover is supplied and maintained free by Cities Service. For further information regarding its availability and uses, write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



Checking Combustion in Glass-Melting Furnace, a Fairmount employee uses the Cities Service Heat Prover for faster, more accurate adjustments. The instrument is supplied free by Cities Service.

Production's Never Bottled Up at Fairmount Glass Works. They produce 288,000,000 bottles a year, use 225-250 tons of glass daily, with many machines turning out 100 bottles a minute!



CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
MAY 26, 1956	116,571	24,618
MAY 19, 1956	117,264	23,735
MAY 28, 1955	174,517	32,039
MAY 21, 1955	187,499	34,437

*Estimated Source: Ward's Reports

fault of the dealers themselves. Three things, the GM executive says, have contributed mainly to the decline in profits this year. They are high overhead, a lag in taking action to cut expenses and failure of the spring car market to materialize.

Dealers spend a lot of money advertising, but in many cases it is wasted because the ads are aimed at other dealers and not at the customers.

The policy of concentrating all ads on price alone encourages a prospective customer to shop around. It is Mr. Wiles' contention that if a dealer took some of the money in his advertising budget and spent it on customer relations and service, he would be much better off.

Follow Suit . . . A satisfied customer is still the best advertisement. Word of mouth advertising costs nothing and is a lot more effective.

Thus, Mr. Wiles has been setting the stage for a return to quality merchandising in the automobile field. Other GM divisions are also falling in line. Each division manager either has appointed or is in the process of naming a dealer contact man with the same job as Mr. Wiles, but on a divisional level.

With this sort of thing taking place, it is doubtful if Congress will eye the impending dealer legislation in a favorable light this year.

Cutbacks Continue

Cutbacks in production and layoffs in the industry continue to mount. Latest estimates place third quarter car production in the neighborhood of 750,000 units.

This is lower than it has been for a long time and there is one big reason for it.

Stocks of new cars continue to push the 900,000 mark. And schedules have to be cut to balance out the inventories with the demand for cars.

Every auto executive in Detroit admits that the third quarter this year is going to be one of the slowest in recent years. But they hastily add that they expect the last quarter to come back with a bang.

Introduction of the new model cars is expected to give the market a badly needed shot in the arm. The demand for raw materials is expected to increase proportionately.

Some steel producers are taking pains to point out to purchasing agents that although the demand for steel from automotive has slackened off, the steel picture as a whole is still very sound.

Ford Diversifies

Ford Motor Co., which has been concentrating almost solely on automobiles since 1946, has started to diversify its operations.

AUTOMOTIVE NEWS

The company, in announcing the formation of Aero-Nutronic Systems, Inc., has completely reversed the policy it put into effect at the end of World War II.

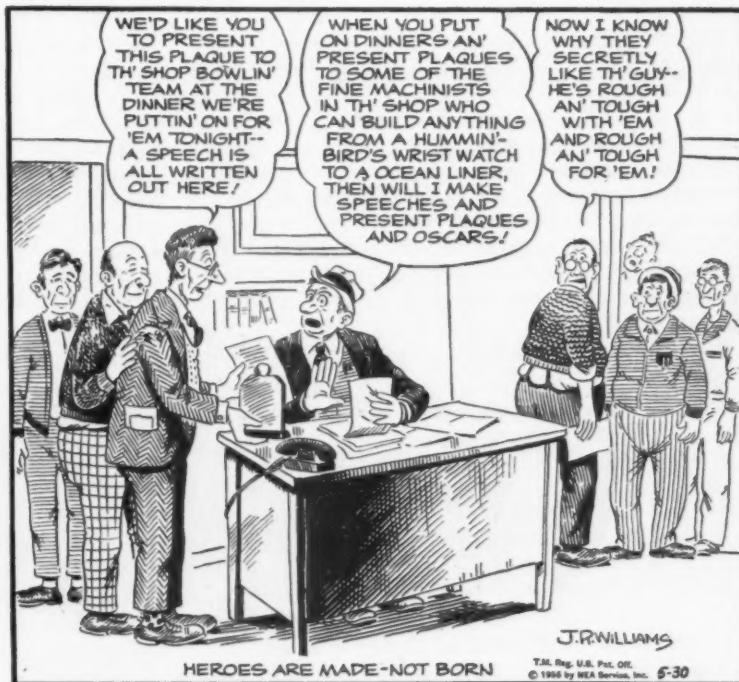
In 1946, when Ford was rapidly losing money, Henry Ford, II, and Ernest R. Breech, chairman of the board, decided it was best to drop all holdings the company had which were not concerned specifically with the production of automobiles. The exceptions were defense production and the manufacture of farm machinery.

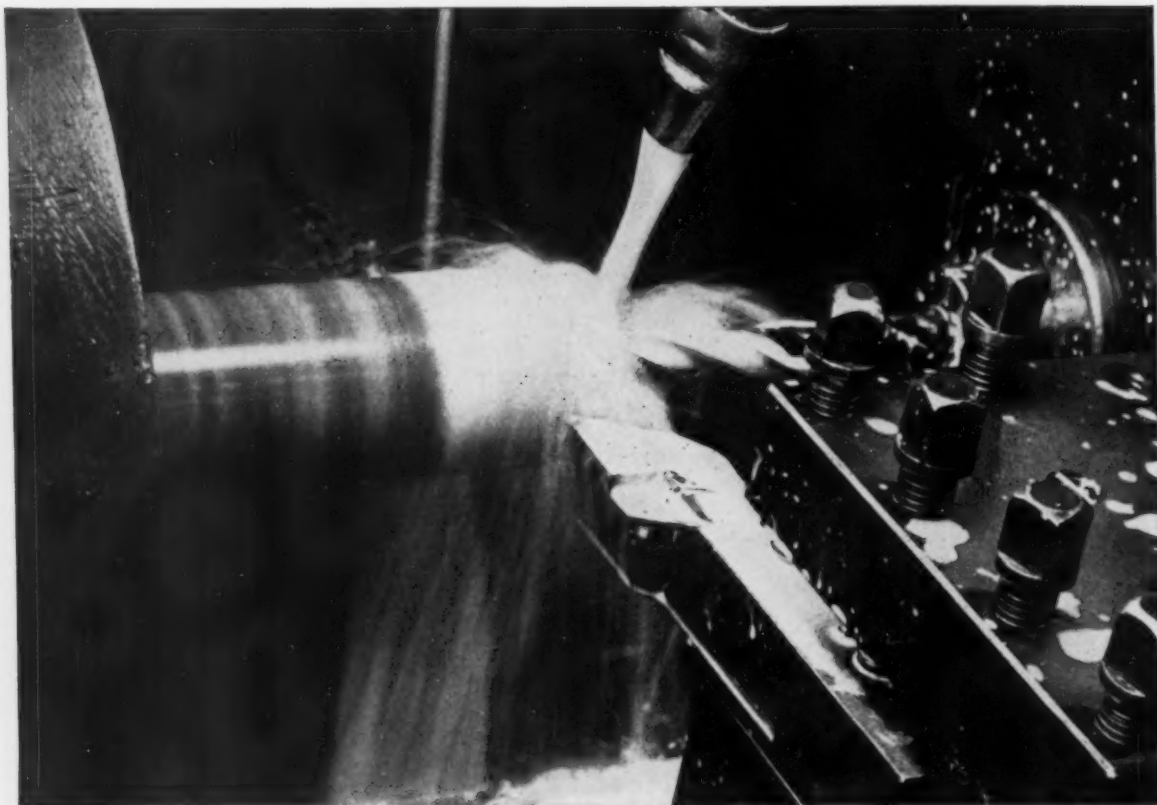
Mr. Breech says he feels the new company will make important contributions to the defense of the United States and to developments in the fields of electronics, physics and nucleonics.

Nucleus of the new firm is a group of scientists and engineers formerly organized under the name of Systems Research, Inc., a Los Angeles firm which was engaged in the design of weapons systems.

THE BULL OF THE WOODS

By J. R. Williams





How to make your automatic machine tools even more automatic—at no extra cost

CONTINUOUS production is what makes your automatic machine tools profitable. Every time you have to stop them to make an adjustment or a change in setup, you reduce their potential. This puts greater demands than ever on the uniformity of the steel you machine. And the more uniform your steel machines, the more automatic your machine tools become.

You can get the ultimate in uniformity at no extra cost by using Timken® fine alloy steel. Timken steel is uniform from bar to bar, heat to heat, order to order. Here's why:

We use the industry's first direct-reading spectrom-

eter to insure uniform grain size and to control chemical composition right up to the time each heat is tapped.

We adjust our conditioning procedure to suit your machining requirements. Your order is handled individually. Each bar is stamped to identify the heat it came from. Uniformity is constant from bar to bar and heat to heat.

To make your automatic machine tools even *more* automatic—and at no extra cost—specify Timken steel machining bars. They machine the same time after time after time after time. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



THIS WEEK IN WASHINGTON

Red Trade by British Irks Washington

Use of "special circumstances" clause gives Britain opening to ship to Reds . . . Actions may hurt foreign aid appropriation . . . Administration will enter steel negotiations if Defense is threatened—By G. H. Baker.

♦ **SHIPMENTS** of machinery, scarce metals, and other strategic goods to Communist nations are now being scheduled by Britain, thus violating the spirit if not the letter of "don't-aid-the-Reds" rules agreed to by non-Communist countries. This is the substance of a fresh attack on Britain's Communist trade by Senator John L. McClellan, D., Ark.

McClellan says Britain wants so badly to trade with Communist nations that she is willing to ignore agreements made with the United States to omit sending any military or strategic commodities to Red ports.

Special Circumstances . . . The British government admits trading with the Communists. But she says her agreement with the U. S. permits the shipment of war goods under "special circumstances."

Trouble is, Britain is getting to regard nearly every shipment of manufactured goods to Russia as one coming under the "special circumstances" clause. Thus, she can claim technically that she has not violated the letter of trade-restriction agreements.

A number of Senate and House members are beginning to ask why the Administration wants Congress to vote nearly \$5 billion in foreign aid for anti-Communist countries at the same time it condones Britain's deliveries of war goods to the Reds. It is obviously senseless, from any point of view, to continue building up defenses while we wink at build up of enemy's strength.

If Strike Comes

Guy Farmer, formerly one of President Eisenhower's labor experts, says the steel companies will settle their contract differences with the united steel workers for an 8 to 10 cents per hour wage increase, plus compromise agreements on such matters as supplemental unemployment pay, an expanded insurance program, and premium pay for week-end work.

He predicts the companies will not put up much of a fight on supplemental unemployment pay, but a knock-down-drag-out ruckus is brewing over premium pay for

week-ends. Steel companies estimate this could cost them an extra 30 cents per hr, but there is very strong grass-roots support for the premium pay and the union will make a last-ditch stand for it, Farmer says.

Threat to Defense . . . What will Ike do? He'll stay out of the fight, just as he has kept out of all other wage disputes. The only thing that will bring the White House into the negotiations will be a sudden outbreak of war or international crisis. Farmer warns that a prolonged steel strike also could bring the White House into

States to Assist SUB Payments

♦ **STATE** governments get the go-ahead signal from federal authorities to use U. S. funds in providing data to large auto companies that will put their supplemental unemployment benefit (SUB) plans into effect on June 1.

There's a limitation on the federal approval, given by the Bureau of Employment Security, U. S. Labor Dept. States are told they may supply information to the extent that it will assist the workings of state unemployment payment systems.

Joblessness in the auto industry topped 150,000 in mid-May, as General Motors, Ford, and Chrysler made plans to begin paying benefits under the SUB arrangement on June 1. The firms will

disburse weekly sums from trust funds set up under management-labor agreements last year.

Manufacturers have paid 5¢ per employee-hour to start the funds toward a future aggregate maximum of about \$250 million. Combined payments from the companies and the state systems are to equal 65 pct of the employee's normal take-home pay for his first four weeks of joblessness and 60 pct for the next 22 weeks, as long as his points last.

States are authorized to issue a cash memo or receipt when benefits are paid in cash. Recipients could use them in applying for SUB payments. At latest count, 14 states had approved use of the SUB funds with state benefits.

JUNIOR'S CONTROL KEEPS HIM "IN THE SWIM"!

(or how to win in sports and business!)



CHIEF KEOKUK:

"Where little chief? This water polo game got me confused."

CHIEF KEOKUK JR.:

"Modern methods help me control ball and beat big chief."

PRINCESS WENATCHEE:

"Looks like another goal for Junior!"

In water polo or in processing iron and steel it pays to employ control! Many foundries and steel plants control costs and quality with Keokuk Silvery Pig Iron . . . the superior form of silicon introduction. Pig for pig, car for car, its uniformity

never varies. Handle it by magnet . . . charge it by weight (or count the piglets for equal accuracy). Leading aluminum producers specify Keokuk Silicon Metal for uniform high purity. When you think of silicon, think of Keokuk!



KEOKUK

ELECTRO-METALS COMPANY KEOKUK, IOWA

Wenatchee Division, Wenatchee, Washington

SALES AGENT: MILLER AND COMPANY

332 S. Michigan Avenue, Chicago 4, Illinois

3504 Carew Tower, Cincinnati 2, Ohio

8230 Forsyth Blvd., St. Louis 24, Missouri

Keokuk Silvery Pig Iron is available in 60 and 30 pound pigs and 12½ pound piglets . . . in regular analysis or alloyed with other elements to match your requirements.



the negotiations. Clearly, the entire defense production program would be affected by a long strike, and Ike would not stand idly by and watch the defense program fall apart without intervening to end the strike.

Labor:

Court decision means fight for union shops

Labor unions are going to be fighting harder in the months ahead to establish nationwide union shops in all industries on the strength of the U. S. Supreme Court's validation of railroad closed shop agreements.

The high court gave a boost to the union shop movement by ruling 9-0 that the closed shop established by Congress in the Railway Labor Act is valid everywhere, including the 18 states which have outlawed closed shops. Crux of the decision is that Congress has the right under the Constitution to overrule state labor laws.

No other union contracts are bound by the decision now, because under Taft-Hartley Act and other federal labor laws, union shop agreements do not apply in states or territories which outlaw them, and thus except in the railway act, Congress specifically has permitted states to legislate against the union shop.

Opening for Unions

But labor leaders now see the decision on a par with recent Supreme Court decisions on racial segregation in schools and on sedition, and plan to use it as a lever to wipe out all right-to-work laws if possible. They will concentrate on securing amendments to the Taft-Hartley Act which will, like the railway act, prohibit state right to work statutes.

Justice William O. Douglas, who wrote the opinion for the court, did, however, invite court tests of some phases of compulsory unionism. He noted that Congress in sanctioning union shop agreements provided that compulsory membership would not be used to "impair freedom of expression by

making explicit that no conditions to membership may be imposed except as respects periodic dues, initiation fees, and assessments."

Five employees of the Union Pacific Railroad Co. originally brought the suit alleging that union membership would force them to contribute to political candidates, and donate to churches in violation of their constitutional rights.

The Court, Justice Douglas notes, simply ruled on the right of Congress to sanction union shop agreements, and not on whether violations of freedom may result under them.

Allocate Nickel?

The government is giving serious thought to adding nickel to its Defense Materials System of allocations.

Classifying nickel within the framework of the DMS will mean setting the same pattern of allocations for nickel as those already in operation for steel, copper, and aluminum.

At the present time, defense contractors who need nickel are issued "hunting licenses," which permit them to purchase nickel in establishing market prices and to pay market prices.

Pay Premium . . . Firms not holding defense contracts scramble for what they can get at premium prices.

WASHINGTON NEWS

A number of mobilization officials are known to be uneasy over the present system of nickel rationing. True, defense contractors and subcontractors are getting all or nearly all the nickel they need, but firms that fabricate nickel into such non-defense uses as auto trim, electrical appliances, and jewelry are having a rough time.

Ike Hates Paperwork

President Eisenhower is pushing his Administration to step up efforts to eliminate paperwork requirements which put an unnecessary paperwork burden on industry and the public.

Already, according to the President, elimination of unnecessary forms and reports has resulted in "substantial" savings to industry.

The President says that as a result of changes already instituted by the Defense Department, one company estimates it has saved \$75,000. The Administration has a special Advisory Council on Federal Reports which works closely with the U. S. Budget Bureau in trying to prevent bureaucrats from instituting new forms which aren't needed, and in eliminating existing forms.

Keep Up With Court Labor Decisions

- In recent rulings affecting management's relationships with labor unions, here's what courts have ruled:
- An employer who says he cannot afford to raise wages, may in some cases, be forced by the government to open his books and prove the point.
- Pickets who avoid violence may not be penalized for strike violence in which they avoid participation.
- Management may prohibit union organizers from passing out handbills or literature on company parking lots.



THE 1956 IRON & STEEL EXPOSITION

CLEVELAND PUBLIC AUDITORIUM • SEPT. 25-28

★ TELL-ALL EXHIBITS

More than 200 companies that supply materials, equipment and services to the Steel Producing Industry will reveal their latest advances in eye-catching, informative displays and demonstrations.

★ IMPORTANT TECHNICAL SESSIONS

Four full days of intensive technical sessions offer a liberal education in "What's New" in steel plant operation, methods, planning, maintenance and many other pertinent subjects.

No Admission Fee • No Registration Charge

Open to Men of the Iron and Steel and Allied Industries

IRON AND STEEL EXPOSITION

The Industry's Most Specific Show!

For additional information, write

Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22, Pa.



Farwest Expansion Leading Nation

Improved Canadian Northwest and Mexican markets, growing consumer industries changing region from solely an aircraft center to an integrated economy . . . New metalworking plants important—By R. R. Kay.

◆ **SOUPED UP MISSILE** and aircraft programs mean an even faster tempo in the Farwestern states' economy. And for the long pull, the Farwest will continue to outpace the growth trend for the country as a whole in metals, machinery, aircraft and missiles production, and in services.

THE IRON AGE's editor-in-chief, Tom Campbell, long time observer-reporter of Farwestern progress, took a fresh on-the-scene look. What does this expert see?

Management and marketing men in the country's metalworking and metal producing plants could well tuck in back of their minds his observations, made at special IRON AGE meetings with top industrialists in Los Angeles, San Francisco, Oakland, and Denver.

Examine the Facts . . . Mr. Campbell thinks that everybody's bullish predictions on Farwestern growth will turn out too conservative by 1960. And that goes for aluminum and steel producers, public utilities, transportation, and construction.

"Metalworking men in the East and Midwest who still think the area's growth is due to aircraft alone—and there are still plenty of them—just don't know the facts," he believes.

There's more and more evidence of a better-balanced Farwestern economy. Industrial growth is moving hand-in-hand with consumer growth. Says Mr. Campbell: "Very rapidly, this pattern is establishing itself: a tying-together of the entire area, including British Columbia and

Mexico, into a more complete economic unit."

It's plain that Farwestern steel production, despite announced expansion plans, won't come near meeting the demand for many years. Where will the area get the steel for its continuing growth? Mr. Campbell thinks a good part will come from expanded Eastern facilities: Bethlehem Steel's Sparrows Point Works and U. S. Steel's Fairless Works. It's a natural, for the East isn't likely to absorb all the added capacity. And these firms have well-established water distribution channels.

Editor-in-chief's tip: Watch for

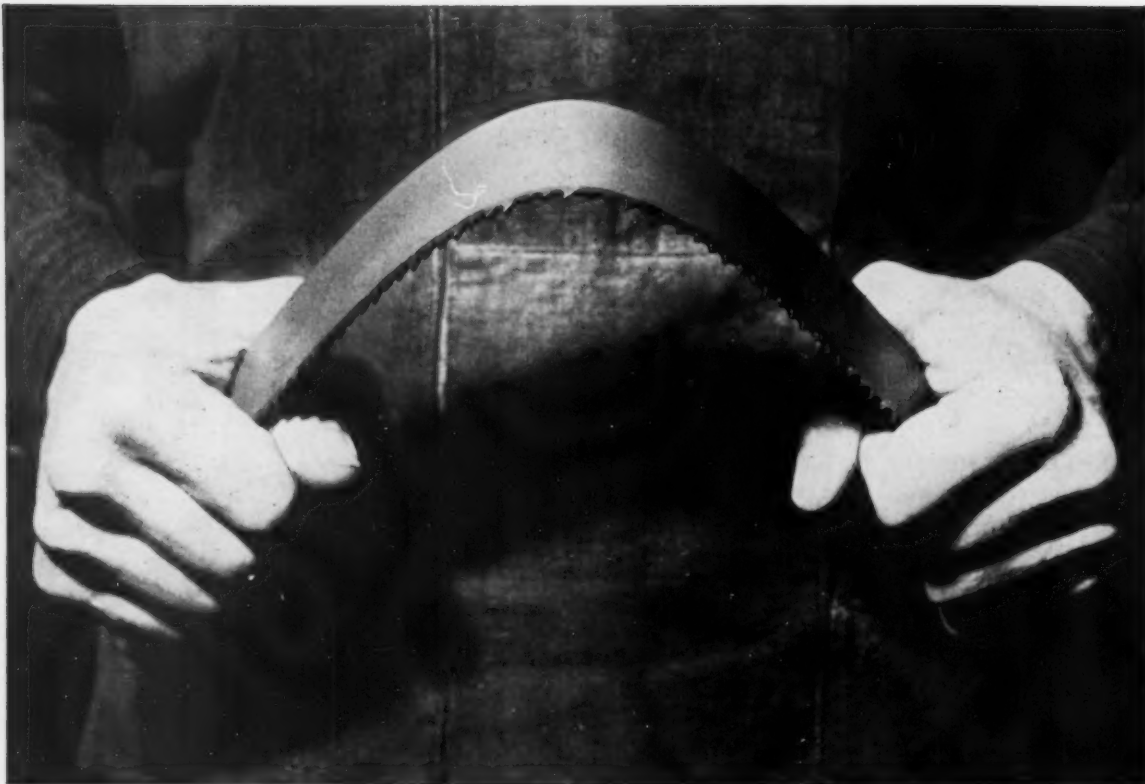
a fast, tremendous growth in consumer goods and service industries.

Canadians Build

British Columbia metalworking is buzzing. Here are some of the latest expansions: Industrial Engineering, Ltd., Burnaby, chain saws; Airco Products, Ltd., Richmond, gas-fired furnaces; Spear & Jackson (B.C.), Ltd., Burnaby, circular and band saws; Yarrows, Ltd., Esquimalt, shipbuilding; L-M Equipment, Ltd., Burnaby, pond and deck saw equipment; B. C. Transformer Co., Ltd., Burnaby, transformers.



IRON AGE editor-in-chief Tom Campbell (l.) and west coast editor Ray Kay (2nd from r.) check production progress at Kaiser Steel's Fontana Works.



THIS is No Ordinary Power Hack Saw Blade

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade—the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge. Development of this high-speed-edge blade made it possible to cut any kind of material from the free machining steels to the toughest of alloys, fast, accurately and economically. Just one type blade to handle any job — no switching blades to cut different materials. Like all good things, attempted copies of this blade have been numerous, but its per-

formance has been *unequalled* by any of the imitators.

The MARVEL high-speed-edge hack saw blade can be tensioned from 200% to 300% tauter than any ordinary hack saw blade, a definite advantage which permits heavier feed pressures to be used without deflection or fear of breakage.

An extremely rugged cutting tool, this one type blade, the MARVEL High-Speed-Edge Hack Saw Blade, will cut any machineable metal with outstanding economy, accuracy, long life and complete safety—it is *unbreakable*.

Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

B-1120

Write for latest cutting tool Bulletin and
the name of your nearest MARVEL Distributor



ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U.S.A.



Time Is Enemy In Aircraft Tooling

Required use of special machining increases time required to turn out military aircraft . . . New techniques can be aid, but not much . . . Needed: more money, engineers—By E. J. Egan, Jr.

♦ **PROVIDED MACHINE TOOLS** and tooling techniques can be said to have a "romantic" side, it will most likely show up in the aircraft industry.

But aircraft makers would gladly sacrifice the spectacular massiveness and complexity of their production methods and equipment. That is, if by so doing they could cut lead time in the design and production of modern planes.

New military aircraft, especially, pose a terrific lead-time problem. It took about four years, on the average, to get present types of fighter planes from drawing board to assembly line.

Nine Year Span . . . But the lead time for a modern heavy jet bomber is about nine years from preliminary design to first flight. More than 100,000 parts go into the making of one of these 350,000-lb, 650 - plus - miles - per - hour monsters.

Dimensions and tolerances are not only more critical than ever before; they're often difficult to achieve and maintain with new manufacturing methods and new materials, such as titanium.

Result is that increasing numbers of special machine tools are needed to support production of advanced-design military planes. Older types of general-purpose equipment just can't handle many of today's materials and tolerances.

Tooling Time Consuming . . . Typical of the special machine tools now in use are large planers,

skin mills, profile mills, rolls and forming machines. Where lead time for a more or less standard machine tool will average six to eight months, a 45-ft spar miller will take 18 months to produce.

Tooling techniques come in for considerable attention, also. New tools, jigs and fixtures are constantly devised to speed production and thus shorten lead time. But what can you do to simplify the jig used for building a mammoth wing? Ones required for modern transports resemble bridge structures. They're so big that workers must use telephones to communicate.

Nevertheless, the battle to

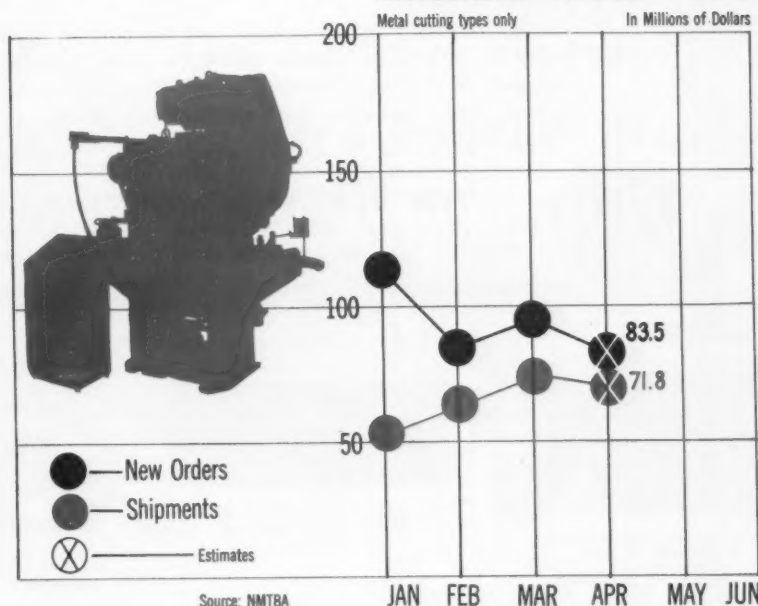
shorten lead time goes on. Airplane makers say the fight can only be won with more money and more engineering talent.

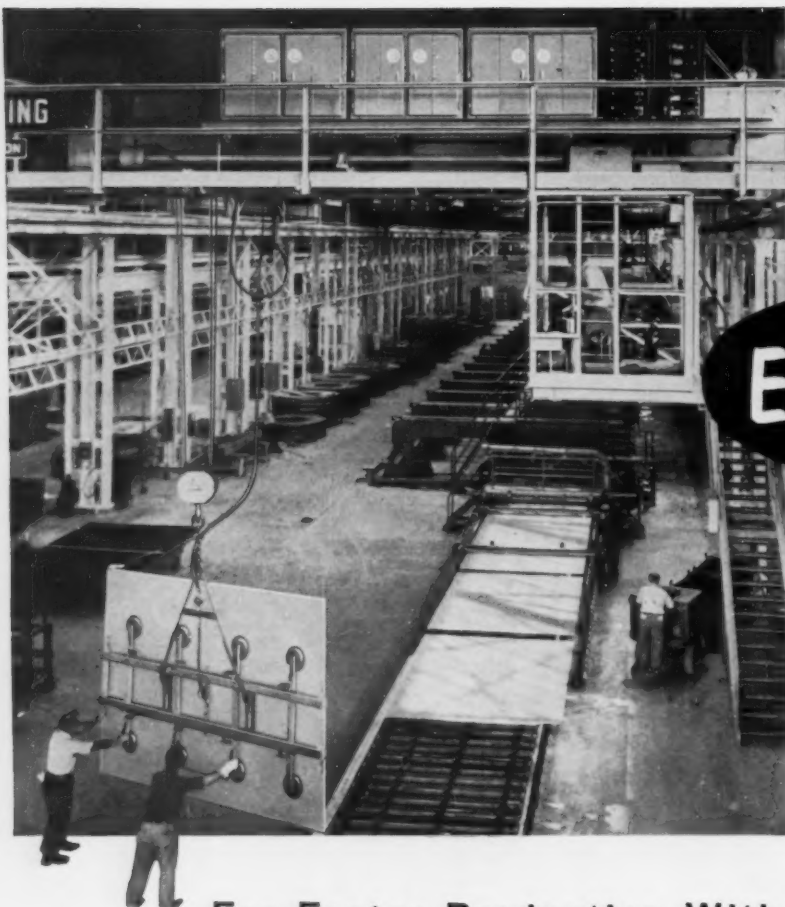
Orders Continue High

New orders for metal cutting machine tools totaled an estimated \$83.5 million in April. That's \$11.8 million below the March total, but about \$11.5 million over April, '55.

April shipments for metal cutting equipment are estimated at \$71.8 million by National Machine Tool Builders' Assn. statisticians. That's a drop of about \$2.4 million below the March total, but it's still \$18.6 million more than builders delivered in April last year.

MACHINE TOOLS 1956





Easy does it...

with EC&M
ENGINEERED
CRANE CONTROL

◀ One of several EC&M Controlled cranes which serve the grinding and polishing lines in a glass manufacturing plant. EC&M Control permits slow even speeds... as workmen walk along and guide the load... as glass is gently lowered onto the work tables.

For Faster Production With Greater Safety

Your crane control is developed by EC&M from the crane data sheet. From gearing, rope reeving, motor loading and similar data, EC&M coordinates the control components to give the desired speed regulation that results in smooth performance... right from the start.

Before buying your next crane, call the nearest EC&M office and ask for a demonstration. They'll be glad to provide you with an opportunity to climb aboard and operate an EC&M controlled crane. Remember... EC&M control equipment assures precise performance for both old and new cranes... and performance is proof.

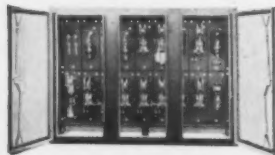


THE ELECTRIC CONTROLLER & MFG. CO.

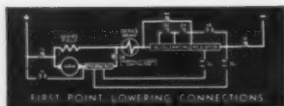
DIVISION OF SQUARE D COMPANY

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Quick-responding Crane Controller with LINE-ARC Contactors and TIME-CURRENT Acceleration



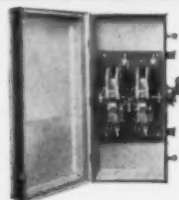
EC&M simplified Wright Circuit provides safe hoist operation



"WB" Brake provides long life and high speed operation



Youngstown Safety Limit Stop eliminates over-hoisting accidents



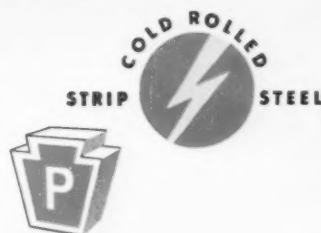
Manual-Magnetic Disconnect Switch has high interrupting capacity... provides remote control



Pattern Design Strip—"Thomas Strip is the only company that can supply our requirements for Pattern Design plated strip," says an official of Milwaukee's M. A. Gerett Corp., world's largest manufacturer of fine coin banks like those shown above in assembly. Thomas' lacquered copper, brass and nickel coated strip cut M. A. Gerett's rejection rate 7 percent. Piece buffing at Gerett was eliminated through adoption of Thomas' Pattern Design Strip. Die life increased, too, because the strip's coating acts as a lubricant during the forming operation. yet doesn't crack.



Brass—Gleaming brass coated strip from Thomas offers manufacturers electrolytically pre-coated steel with a finish that can be oxidized readily to a variety of shades. Subsequent lacquering gives an attractive and permanent final product finish. Here is steel's strength and economy with the advantages of brass. It protects parts-in-process against corrosion and lends itself readily to production of small stampings, drawn parts, tubing and roll-formed sections. Available in natural, planished and buffed finishes in a variety of widths, tempers and gages.



You Can Bank On Saving Money With *Thomas Strip* Pre-coated Steel

Manufacturers using Thomas Strip—pre-coated with zinc, copper, brass, nickel, tin or lacquer—are piling up big dollar savings.

These fabricators are reducing their production costs . . . stretching supplies of hard-to-get, expensive metals . . . and making their finished products more competitive and attractive.

Pre-coated steel specialties from the Thomas Strip Division of Pittsburgh Steel Company come to you already electroplated with zinc, cop-

per, brass or nickel. Or you can get them hot dip coated with lead alloy or tin. Natural, planished or buffed finishes are available. Lacquer coatings are furnished in a full range of colors or in clear lacquer. Thomas also can supply you close tolerance plain steel strip in a variety of tempers, grades and finishes.

Thomas Strip has long been recognized for precision rolling to extremely close tolerances in gages down to .004 inch and up to 22 inches in width. Tempers include 1,

2, 3, 4 and 5, or special tempers as required. You can get Thomas Strip in oscillated or ribbon-wound coils or in cut lengths. A choice of edges is available to meet your exact specifications.

Don't overlook the possibilities of Pattern Designed rolled strip which Thomas produces in an almost unlimited variety of patterns in coated and uncoated finishes. Turn the page to see how other manufacturers are cutting costs with Thomas Strip products.

HOW PRE-COATED THOMAS STRIP SAVES YOU MONEY





Nickel Coated Strip—Loose Leaf Metals Co. of St. Louis is one of the largest manufacturers of metal hardware for binders and loose leaf books. Photograph shows production of a metal part for a first grade ring metal. President George A. Ober says: "We have never experienced a flaky surface on a Thomas product. We've come to know Thomas will not ship until its product is right, therefore, we have never had to reject their materials." Thomas is a major supplier of cold rolled nickel, copper, tin, zinc and lacquer coated steel.

Plain Steel—Bright uncoated steel strip in low carbon, alloy and spring steel grades, has uniformity of temper, gage and finish. Above, plain cold rolled steel passes through a temper mill at the Thomas Strip plant. In addition to high finishes, Thomas Strip is available in dull and regular finishes, in coils or cut lengths—in a choice of edges—and a range of specifications.

Here's Why You Cut Costs With *Thomas Strip*



Copper Coated Strip—Here's the evolution of a Ray-O-Vac flashlight—from electroplated copper strip, produced by Thomas Strip, to the finished product. Blake Manufacturing Division of Ray-O-Vac Company at Clinton, Mass., changed from brass to steel for this and other flashlight cases. Production savings from 17 to 29 percent resulted. Ray-O-Vac uses a .020 gage, non-scalloping, deep drawing quality strip steel produced by special processing techniques. The steel is electro-copper coated on both sides, and is 6% inches wide. On three popular models alone, the savings amounted to more than \$100,000 in one year.

- **Thomas Strip Fabricates Easily**—Coatings stand fully as much fabrication as the easy-to-work base steel.

- **Die Life Is Lengthened**—Most coatings lubricate dies, reduce wear.

- **Gives Maximum Pieces Per Pound**—Because Thomas Strip is rolled to extremely close tolerances, you get the maximum number of parts per pound of metal.

- **Cuts Plating Costs**—Thomas coatings can serve as a final product finish or as a prepared base for further plating or painting.

- **Your Manufacturing Processes Are Streamlined**—Ready-to-fabricate Thomas Strip streamlines your manufacturing processes to two essentials—fabricating and assembly.

- **Extends Economy Of Steel To Many Parts**—Pre-coated Thomas Strip replaces more expensive metals.

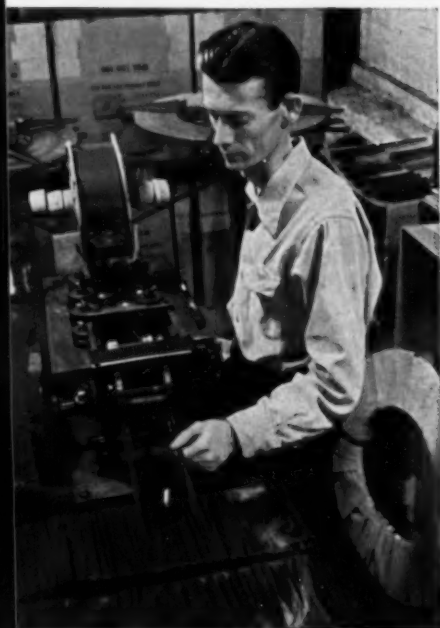
- **You Can Begin To Save Today**—Experienced Thomas metallurgists and technicians are available now to help you with your steel problems. Their help is yours for the asking. Write or call any Pittsburgh Steel Company sales office.



Zinc—Long “strips” of Thomas zinc-coated steel hold the vegetable fiber in Fuller Brush Co.’s power-driven brushes shown above. In foreground is an industrial brush used to process plywood. The brush in the background is for an automobile washing machine. Although zinc-coated steel undergoes a severe deformation in forming machines, this Thomas product takes the punishment easily. The heavy, uniform coating of zinc remains undamaged, giving the brushes long life.



Tin Coated Strip—International Register Co. of Chicago, producer of electrical timing devices, made approximately a 20 percent saving when it switched to Thomas pre-coated strip. Tin coated strip, like that above, provides corrosion resistance to dials, gear case covers and other timer parts. Above, Ray Gabriel, International’s Steel Buyer, shows Pittsburgh Steel representative Buck Mills a completed Inter-matic Time-All appliance timer.



Lacquered Strip—“Nothing works as well on our machines as lacquered steel strip from Thomas,” declares Max Haas, plant manager for Hinton Associates, Inc., of Staten Island, N. Y., manufacturer of Happiness Bird Cages. Hinton Associates processes blue or pink lacquered strip in the machine shown above to form a border for seed guards on its cages. Mr. Haas said: “We like Thomas lacquered strip because it doesn’t break in forming machines or power presses. The zinc backing on the strip permits the rolls to get a good grip when the metal passes through our machines.”



High Carbon—Thomas Strip’s high carbon strip gets a tough test in the Toledo, Ohio, plant of Prestole Corp., manufacturers of steel fasteners. Prestole bends, twists, shears, punches and forms Thomas Strip’s high carbon strip, as in the operation above. It has to have steel that’s free of excessive burring, gives the finished fasteners the right springback and proper tension. Each coil must be uniform in chemical and physical specifications. “We’ve never had a complaint yet about Thomas quality,” says Roy Gutzmer, plant manager.

Thomas Strip®

Division



Pittsburgh Steel Company

Grant Building

Pittsburgh 30, Pa.

District Sales Offices:

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Dallas
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New York
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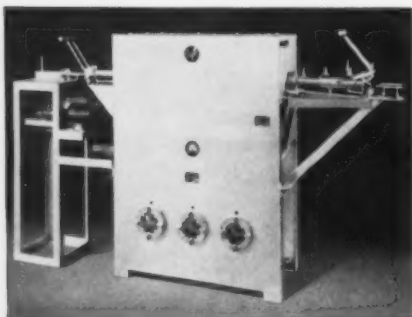
Tulsa
Warren, Ohio



HARPER

THE COMPLETE LINE OF SINTERING FURNACES

Here Are Six Types of Harper Electric Furnaces Being Used for Powdered Metal Work

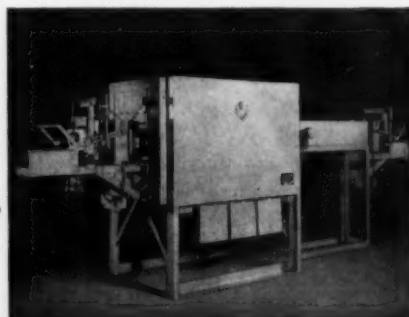


HIGH TEMPERATURE TUBE FURNACE

The only sintering research furnace with really uniform heat up to 3000°F., fast heating, suitable for almost any atmosphere, and low in cost. Has been used by many of the foremost powder metallurgy researchers for 15 years.

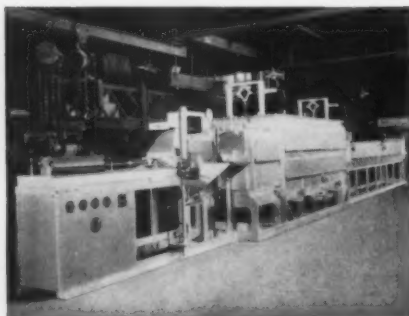
CONTROLLED ATMOSPHERE BOX FURNACE

Ideal for research, pilot plant, and small production. Temperatures up to 2500°F. with reducing atmospheres. Used with and without muffle. Suitable for batch or straight-through pusher operation, with water-cooled cooling chamber. Wide range of sizes.



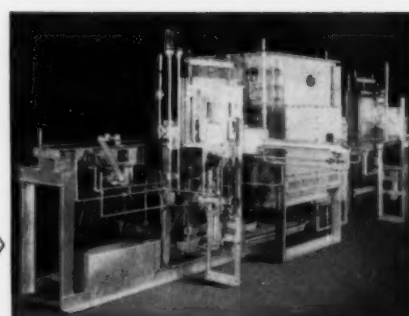
MECHANICAL OR HYDRAULIC PUSHER FURNACE

These continuous automatic furnaces are used for sintering of heavy parts on a large-volume basis. Ideal for work requiring long soaking periods at temperatures up to 2300°F. Several zones of temperature control. Available with purge chambers for dry hydrogen service.



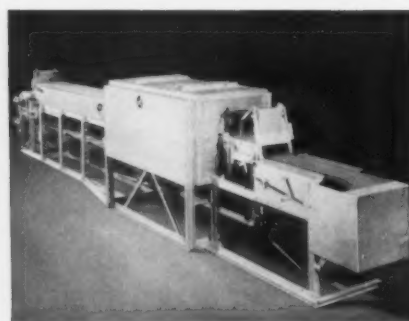
MOLYBDENUM GRID FURNACE

Moly furnaces handle the sintering applications up to 3000°F. Presently in use on carbides, tungsten contact points, heavy metals, and metallizing ceramics. Available as batch or continuous pusher furnace.



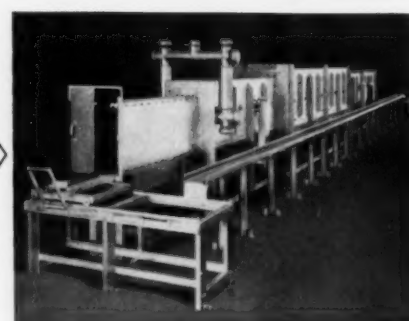
CONTINUOUS MESH BELT CONVEYOR FURNACE

For automatic uniform sintering of small parts at production rates up to 450 pounds per hour. Used with special atmospheres at sintering temperatures up to 2100°F.



CONTINUOUS TUNNEL KILN

Both pusher and continuous car tunnel kilns are used at temperatures up to 2750°F. for sintering ferrites, permanent magnets and carbon parts. Designed to maintain extremely close control of firing curves. Equipped for use with or without special atmospheres.



YES, HARPER engineers have been applying heat to the sintering of powdered metal parts for over 15 years, at all stages from research to completely automatic high production.

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The Iron Age

SALUTES

Van H. Lechlitter

Vice president of American Steel & Wire Div., U.S. Steel, he applied the science of metallurgy to wiremaking with great success. His ancestors were making steel as far back as the 1740's.

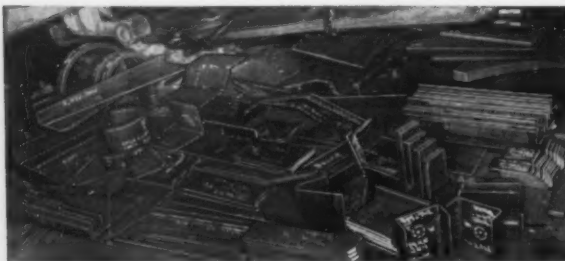
In the dark days of 1932, a young metallurgist with a new sheepskin was trying to show the oldtimers around American Steel & Wire Works at Worcester, Mass., how to make wire the scientific way. Van H. Lechlitter had cut out a tough job for himself.

The elder craftsmen prided themselves on their judgment and relied on innate skill for drawing and heat treating metal. They had little use for the evangelism of the new laboratory assistant. Worcester Works at that time was making elevator wire rope from imported Swedish rod—but was getting up to 60 pct rejections. Although trained in the scientific method, young Lechlitter during his school days had worked at general labor, blacksmithing, maintenance and sheet metalwork. He understood the psychology of the old artisans and in due time showed them how they could increase their yield from the Swedish steel to 95 pct.

This achievement naturally caught the attention of higher ups and Mr. Lechlitter shortly

was on his way to Cleveland as a metallurgist in the vice president's office. In the following years, he advanced through supervisory-level positions and by 1953 was named a full vice president. Recently, he received the David Ford McFarland Award for achievement in metallurgy from the American Society of Metals chapter at his alma mater, Penn State University. The award was in the best tradition of the Lechlitter family, which has been in the steel business in America since the 18th Century. His forebears arrived in Pennsylvania from Holland in 1741.

In his leisure, Mr. Lechlitter collects useful antiques, goes fishing, plays duets at the piano with his wife, the former Helen Rogers of Johnstown, Pa., and pals around with his son, Van Jr., in the Cub Scouts. Now a seasoned hand at wiremaking, he still keeps his mind open for new methods—recalling the day not too long ago when he had to overcome a mountain of tradition to sell young ideas.



Some of the thousands of varied parts formed on the Steelweld Press. These involve bends and curves of every description in many

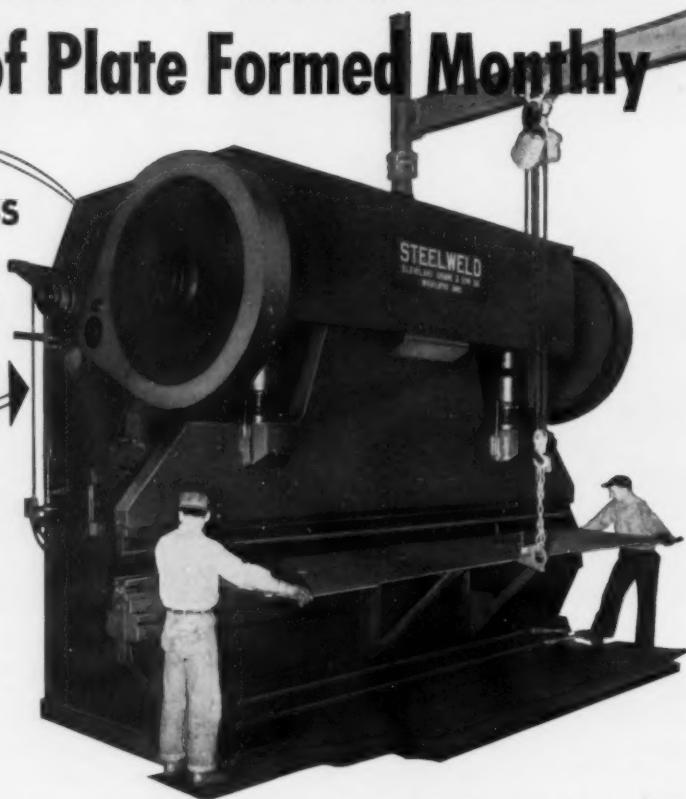


plate thicknesses. Bars of heavy cross-section, usually requiring a bulldozer, are formed into semi-circles for gear rims and similar uses.

800 Tons of Plate Formed Monthly

STEELWELD PRESS
Produces
Infinite Variety of
Curves and Bends

This Steelweld Press is rated at $\frac{1}{2}$ "x14'-0" mild steel. With the 24-inch bed and ram extension at each end, it will bend plate that can clear by the 18-inch deep throat to 18'-6" long. Two cross shafts with foot pedals are provided for operating the press. The lower shaft is for normal operation while the upper shaft brings the reversing flywheel into action to back the ram off the work whenever desired.

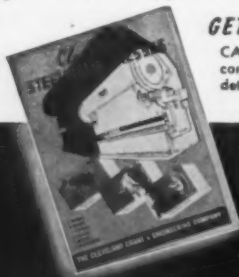


EVERY month some 800 tons of plate of all thicknesses to one-half inch is formed with bends and curves of every description on a Steelweld Press. The machine is in operation nine hours a day.

Since parts formed are produced in very small duplicate quantities, the dies and machine settings usually must be changed many times during a day.

Because of the ease with which Steelweld Presses can be set up, the operators can do this quickly and easily.

Steelweld Presses offer so many advantages that we urge you to write for the catalog below and get all the facts on them. Hundreds of these machines are now in use for bending, forming and punching operations of every description.



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BENDING PRESSES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

The Iron Age INTRODUCES

George B. Schierberg, elected president and treasurer, **Granite City Steel Co.**, Granite City, Ill.

N. P. Veeder, elected executive vice president, **Granite City Steel Co.**, Granite City, Ill.

James L. Hamilton, Jr., elected vice president and general manager, sales, **Granite City Steel Co.**, Granite City, Ill.; **John N. Marshall**, elected chief executive officer and re-elected chairman of the board.

W. G. Harter, elected executive vice president and treasurer, **Continental Steel Corp.**, Kokomo, Ind.; **F. R. Davis**, elected vice president, purchases; **Arthur L. Miller**, elected vice president, operations.

Harry C. Bell, elected vice president, engineering, **Ohio Injector Co.**, Wadsworth, O.; **W. G. Shepard**, elected vice president, sales.

Chad W. McMills, elected assistant to vice president, sales, **Columbia-Geneva Div.**, U. S. Steel Corp., San Francisco.

Edwin M. Butler, elected assistant to executive vice president, **Heintz Manufacturing Co.**, Philadelphia; **John H. Thatcher**, named manager, Quality Dept.

Richard D. Owens, appointed superintendent, **Ideal Foundry Div.**, **Republic Steel Corp.**, Newton Falls, O.

R. P. Broadhurst, named district sales manager, Chicago, **The Youngstown Sheet and Tube Co.**, Youngstown, O.; **C. Hix Jones**, named district sales manager, Dallas.

E. F. Morse, named Cleveland district manager, **Sturtevant Div.**, **Westinghouse Electric Corp.**, Cleveland.

Howard H. Wilder, appointed assistant manager, engineering-sales, **Vanadium Corp. of America**, New York; **George W. Johnson**, named manager, Foundry Div.

Alan W. Abegglen, appointed manager, **Tubular Products Div.**, Cleveland district sales office, **The Babcock & Wilcox Co.**, Beaver Falls, Pa.

Fred C. Leeming, appointed Los Angeles district sales manager, **Superior Steel Corp.**, Carnegie, Pa.

James E. Barnes, named sales manager, **Buhr Machine Tool Co.**, Ann Arbor, Mich.

Owen Richards, named manager, mine and titanium ore dressing plant, **Metal & Thermit Corp.**, Beaver Dam, Va.

Paul M. Thomas, appointed mid-western regional manager, **Chase Brass & Copper Co.**, subsidiary of **Kennecott Copper Corp.**, Waterbury, Conn.; **Alfred M. Johnson**, named district manager, Dallas.

PERSONNEL



WALTER W. TANGEMAN, elected chairman of the board, **Cincinnati Milling Machine Co.**, Cincinnati.



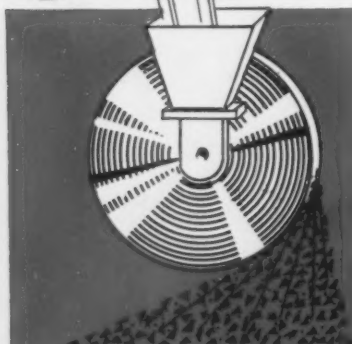
SWAN E. BERGSTROM, elected executive vice president, **Cincinnati Milling Machine Co.**, Cincinnati.



W. E. TROMANHAUSER, elected vice president and general sales manager, **The Pryene-C-O-Two Div.**, Newark, N. J.



OWEN C. DAVIS, elected treasurer, **Vickers Inc.**, Detroit.



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W. P. Cornwell, named sales manager, Dallas district, **Wyandotte Chemicals Corp.**, Wyandotte, Mich.

Harry J. Bernat, appointed division manager, Kaiser Engineering Div., **Henry J. Kaiser Co.**, Oakland, Calif.

Arnold R. DeWalk, named works accountant, **American Welding and Manufacturing Co.**, Niles plant.

W. J. Reed, appointed district manager, Cleveland office, Alloy Metal Wire Div., **H. K. Porter Co., Inc.**, Prospect Park, Pa.

Thomas B. Kalbfus, named general sales manager, Television-Radio Div., **Westinghouse Electric Corp.**, Metuchen, N. J.

Following promotions are within the Engineering Dept. of **Worthington Corp.**'s Harrison Div., N. J. **E. C. Schmachtenberg**, named assistant to manager, engineering; **Hunt Davis**, appointed chief engineer, compressors; **C. A. Macaluso**, named assistant chief engineer, compressors; **W. F. Donovan**, appointed assistant manager, research and development.

Robert H. Binkerd, named sales promotion manager, spring and forge products, **Alco Products, Inc.**, Latrobe, Pa., plant.

J. H. McCorkle, appointed manager, Container Divisions plant, **Jones & Laughlin Steel Corp.**, Port Arthur, Tex., and New Orleans; **Richard C. Reed, Jr.**, appointed district sales manager, New Orleans.

Thomas M. Nourse, appointed Pittsburgh district sales manager, industrial sales, controls, and Chemical Divisions, **Hagan Corp.**, Pittsburgh; **John E. Duesing**, appointed national sales manager, Controls Divisions.

Alfred A. Augustine, appointed chief engineer, **Loftus Engineering Corp.**, Pittsburgh.

PERSONNEL



JOHN B. GIRDLER, elected assistant vice president and general manager, sales, **Vanadium Corp. of America**, New York.



RAYMOND H. FILSINGER, JR., appointed sales manager, **Vanadium Corp. of America**, New York.



GLEN J. HARTMAN, appointed manager, operations, Ohio Seamless Tube Div., **Copperweld Steel Co.**, Shelby, O.



GEORGE SINES, appointed chief engineer, **Easton Car & Construction Co.**, Easton, Pa.

this CINCINNATI PRESS BRAKE

is giving accurate and versatile performance at

UNITED STEEL FABRICATORS, Inc.

With ample capacity, this powerful 500 Series Cincinnati Press Brake with 18' 6" clearance between housings and 22' die area—handles formed structural bridge flooring, guard rails, steel doors, Girders, and side walls for various types of metal buildings are also produced.

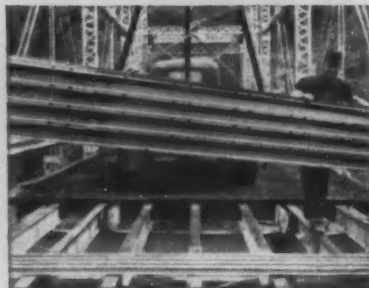
United Steel Fabricators, Inc. are pleased with the accuracy in forming and ease and speed of operation which are important factors in this economical production.

INVESTIGATE:

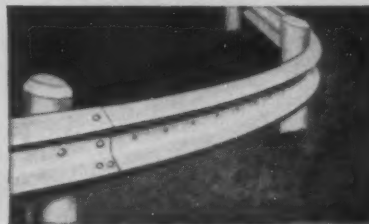
- Cincinnati Center Line Loading
- Cincinnati Interlocked Construction
- Cincinnati Rigid Deep Beds and Rams

Write for the latest
Press Brake Catalog B-4.

*Photos courtesy of
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Formed structural bridge flooring

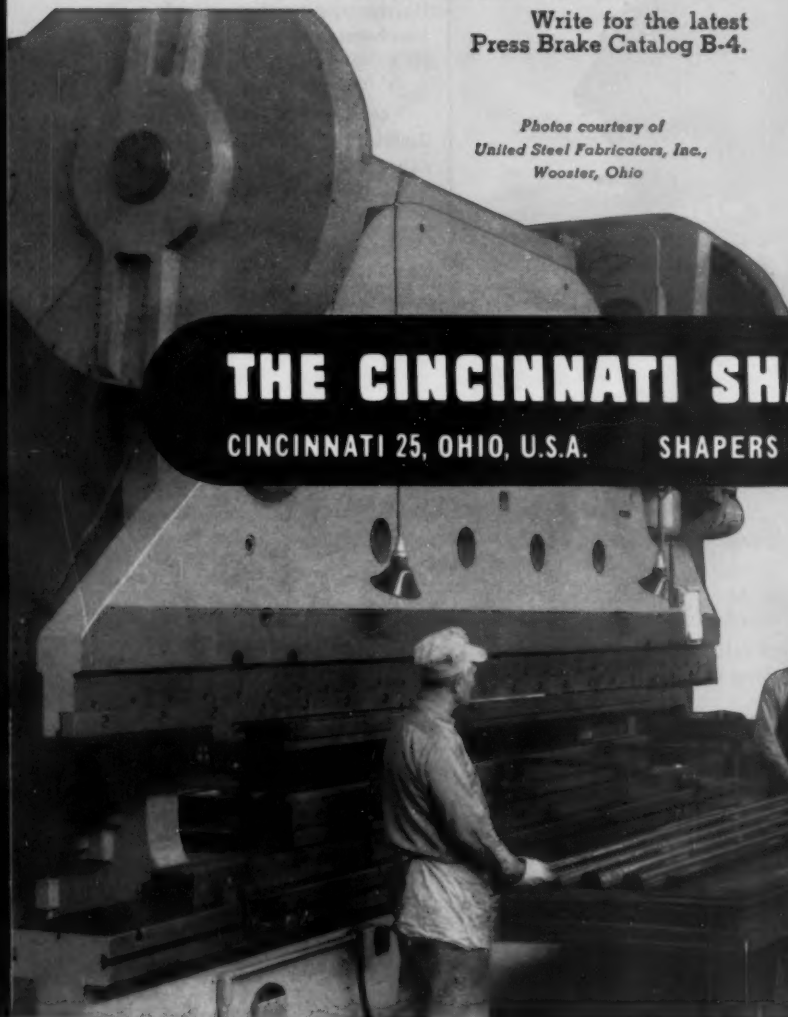


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PERSONNEL

James A. Munro, named manager, Structural Fabricating Div., **Joseph T. Ryerson & Son, Inc.**, Chicago; **Lambert J. Bodeewes**, appointed structural fabricating consultant.

Philip Scarola, appointed sales manager, Crocker-Wheeler Motor Div., **Elliott Co.**, Jeannette, Pa.; **Charles R. Steen**, appointed manager, engineering.

Neil Van Deusen, named general sales manager, V. & O. Press Co. and Henry & Wright Divisions, **Emhart Manufacturing Co.**, Hartford, Conn.

James Dacey, appointed sales representative, Syracuse, New York area, **Binks Manufacturing Co.**, Chicago.

Dr. Alan A. Weinberg and **Bruce N. Wilson**, research chemists, join Research and Development Dept., Plastics Laboratory, **Hooker Electrochemical Co.**, Niagara Falls, N. Y.

Vernon O. Droege, appointed district industrial engineer, Chicago, **The Youngstown Sheet and Tube Co.**, East Chicago, Ind.

Mack W. Bullard, named engineer, Electrical Application Dept., **Allis-Chalmers Manufacturing Co.**, Milwaukee; **Hubert B. Sallee**, named application engineer, Electrical Section, **Allis-Chalmers Norwood Works**.

Perry R. Roehm, elected president, **Norden-Ketay Corp.**, New York.

OBITUARIES

Robert W. Buzzard, 52, project leader, Metallurgy Div., **National Bureau of Standards**, Washington, D. C.

Burton T. Sweely, 70, formerly vice president, research, **Chicago Vitreous Corp.**, Cicero, Ill.

Louis J. Ehlinger, 75, former assistant chief engineer, **Alan Wood Steel Co.**, Conshohocken, Pa.

The sixth element in your Sterling grinding wheel formula

Five elements normally make up the formula of a grinding wheel—abrasive grain, size, grade, structure, and bond. But, in a Sterling wheel, you can get the *sixth* element.

This *sixth* element is the *human* element. It takes into consideration the important factors that never show up in a grinding wheel specification. These include the operator himself, how he works, and all the "little" things that make *your* grinding job different from all others. And it's surprising how much these factors can mean in money and performance.

To formulate for the sixth element, call in one of Sterling's skilled Abrasive Engineers or your nearest Sterling Distributor. Let him study your complete grinding operation and observe your operators.

Sterling's sixth element can mean big savings to you. Act now!



Grinding 4"-diameter boring-machine spindle.



"Wheels of Industry"—Vitrified and Resinoid—to meet the exact requirements of industry.

STERLING GRINDING



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STERLING GRINDING WHEEL COMPANY, TIFFIN, OHIO—SUBSIDIARY OF ABRASIVE AND METAL PRODUCTS COMPANY

NEW

FRONT-TO-BACK CRANKSHAFT DESIGN



embraces numerous operating and structural improvements

Of far reaching importance, the development of Niagara's impressive, new Styleline Deep Throat Presses has opened the way to numerous operating and structural advantages. Barriers imposed by conventional side-to-side crankshaft arrangements and outmoded end wheel designs have been shattered. The Niagara-developed front-to-back crankshaft design introduces a new concept of deep throat press performance and economics:

MODERN, SPACE-SAVING, ENCLOSED CONSTRUCTION

The entire driving mechanism is within the limits of a compact, all-steel frame. There are no exposed, overhanging parts and mechanisms to obstruct crane service, block light, throw grease and consume floor space unnecessarily.

LONGER DIE LIFE, GREATER ACCURACY

Increased distance between gibs makes possible a wider slide (left to right) for greater support to wide dies. Longer gibs assure accuracy for the full stroke.

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With all gears located inside the press frame and overhung bearings eliminated, damaging shaft deflection is held to a new minimum. Both

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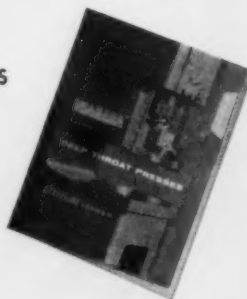
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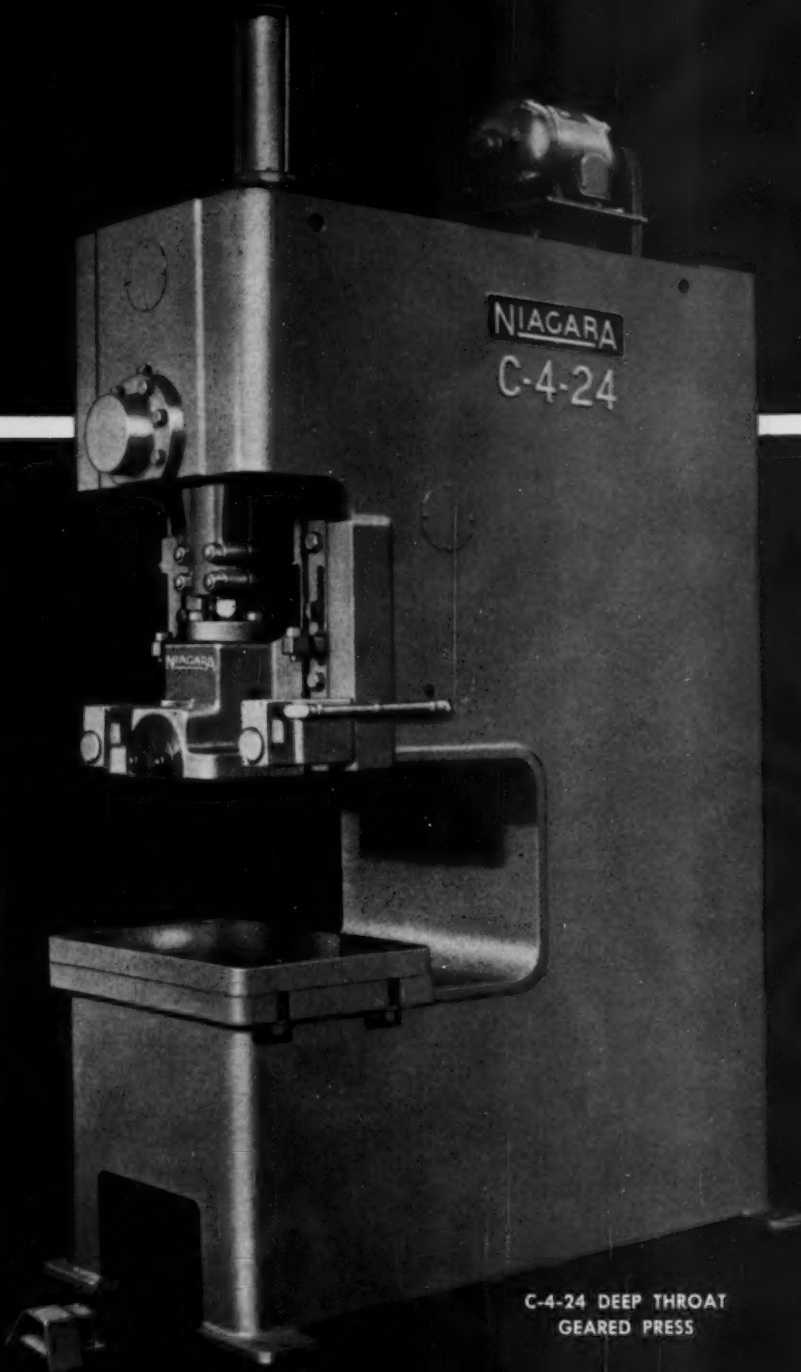
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MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



LOW-COST barrel plating with tin-nickel alloy gives small parts a pleasing, durable finish.

♦ Keep your eye on tin-nickel alloy plating . . . Not long out of the laboratory, it's already a commercial success . . . One reason: Its combined decorative and protective properties are not available in any other electroplated finish.

♦ The alloy plates directly on most basis metals . . . Solution has a high deposition rate, superior throwing power, and is easy and inexpensive to control . . . Metal costs are comparable to those of nickel plating.

By **R. T. GORE**,
Technical Service Engineer,
and **F. A. LOWENHEIM**,
Supervisor, Electrochemical Research,
Metal & Thermit Corp.
New York

May 31, 1956

FEATURE ARTICLES

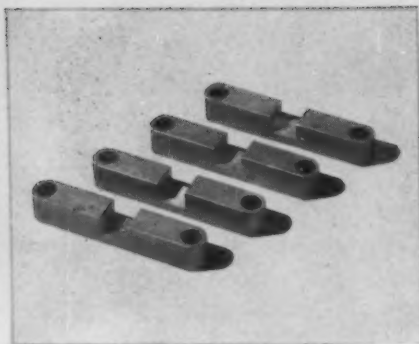
Check its advantages—

Is Tin-Nickel the New Plating Finish You Need?

♦ AT RARE INTERVALS, one of the many combinations of metals that have been electroplated successfully in the laboratory comes out into commercial use. A shining example, recently emerged from the testing stage, is a new tin-nickel alloy deposit.

Initial commercial successes indicate that it offers a combination of decorative and protective properties not available in any other electroplated finish. As a result, it has many potential industrial and commercial applications.

Editor's Note: This is the fourth in a series of articles on alloy plating the authors have prepared for THE IRON AGE. Issue dates and titles for the previous three: December 22, 1955, p. 67, "Alloy Plating Can Give Your Products New Appeal"; February 16, 1956, p. 104, "Is Bronze Plating Your Next Step?"; March 15, 1956, p. 92, "Can Tin-Zinc Plating Improve Your Products?"



ALLOY DEPOSIT makes these instrument brackets both corrosion resistant and non-magnetic.

The alloy, containing approximately 65 pct tin and 35 pct nickel, plates directly onto most basis metals. The bath has excellent throwing power, superior to nickel and many other widely used plating solutions. Operation and control of the process is simple and relatively inexpensive. No hard-to-find chemicals or costly proprietary addition agents are used.

In particular, tin-nickel deposits exhibit these desirable properties:

1. Outstanding corrosion resistance in thicknesses of 0.001 in. and upwards. The deposit is more corrosion resistant than either of its constituent metals; it loses much less weight than nickel when exposed to such chemical or food processing plant acids as nitric, sulphurous, formic, acetic, lactic, tartaric and citric.

2. High corrosion resistance in thicknesses from 0.0005 in. to 0.001 in. In this range, tin-nickel is at least equal to the same thickness of copper plus nickel, and also resists many solutions and atmospheres which corrode both tin and nickel alone.

3. Excellent resistance to tarnishing. This is one of the deposit's outstanding properties. Although tin or nickel plated alone will tarnish quickly, the alloy will not.

4. Excellent potential as a decorative finish. Color of the alloy deposit closely resembles that of stainless steel. On bright undersurfaces (even if irregular) thin deposits plate brightly. If the work surface is dull, or if a thick deposit is required, buffing brings out a high luster.

5. Excellent solderability despite its relative hardness—a metallurgical oddity that suggests many uses.

6. Good hardness and wear resistance. Hardness of the deposit (about 650 Vickers) is between that of nickel and chromium.

7. Stability at temperatures up to 600°F.

Here's the Tin-Nickel Plating Solution:

Constituent	Control Limits
Stannous tin	3.5 - 5.0 oz per gal
Nickel	8.0 - 11.0 oz per gal
Total fluorine	4.5 - 6.0 oz per gal
pH	2.0 - 2.5

8. Complete freedom from internal stress. Thus, the deposit has no tendency to crack or flake. It is moderately ductile, but cannot be formed after plating as readily as tin or copper coatings. However, materials plated with tin-nickel can be bent to about the same extent as those plated with fully bright nickel.

9. The alloy is non-magnetic. This property encourages its use in timing devices, and on analytical balance weights.

Century Plating Co., White Plains, N. Y., has applied these tin-nickel properties to a number of products handled in its shop. And the list of applications is growing steadily.

In one case, the alloy's corrosion-resistant and non-magnetic properties make it especially useful for plating a line of instrument brackets. In another instance, the deposit in hollow cylindrical cases is noteworthy for its corrosion resistance, color maintenance and solderability.

Finish cuts friction

The firm also uses the alloy's low friction coefficient (and other properties) to advantage in plating small gears, shafts and pinions. These gear train components are used in timing devices and other precision mechanisms. The deposit produces a 20 pct reduction in measured friction compared with unplated brass parts.

Plated finish on these precision workpieces is readily wetted by the oils used in the gear trains. Moreover, it is inert to the oils and their decomposition products.

In another case, one of Century's customers had considerable difficulty in stripping plastic molded products from steel molds. After the molds were plated with tin-nickel, separation was accomplished without sticking. The alloy has the corrosion resistance needed for this

service, and its hardness is said to increase mold life. Special anodes are not required to plate the complex-design, multiple-cavity molds.

Tin-nickel plating is used in some assemblies for its color harmony with stainless steel. Certain parts that can be made from brass and other more machinable metals are plated with tin-nickel. When these parts are assembled with the stainless components, the match in color and finish is quite satisfactory.

Tin-nickel has also been suggested for automotive and appliance parts because of its hardness, corrosion and tarnish resistance, and attractive finish. For quality electronic parts, also, it offers a decorative finish, corrosion resistance and solderability.

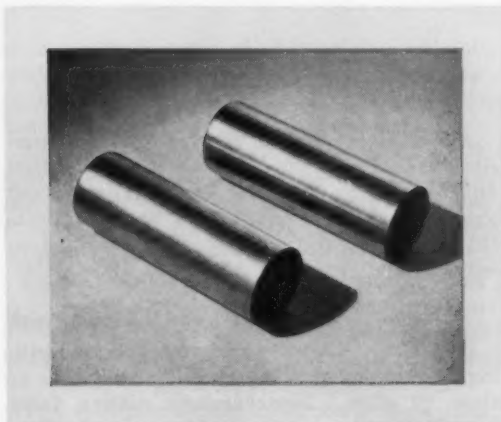
Tin, copper, brass, bronze, cast iron and steel are among the basis metals that can be plated directly with the new alloy. However, for maximum corrosion resistance on steel, an initial bronze or copper strike is advisable. Aluminum and zinc are attacked by the electrolyte, but can be plated successfully over a copper or bronze undercoat.

The alloy can be deposited in practically any desired thickness, and 0.010-in. thick finishes present no difficulty. The solution tends to plate uniformly; unless workpiece contours are very irregular, thickness varies slightly.

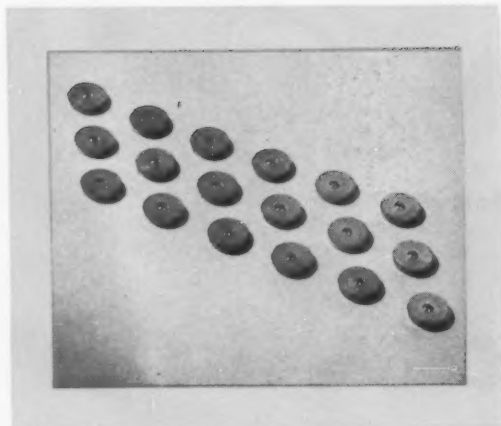
Throwing power of the solution is excellent, also. Plating deep recesses requires no special racking methods or internal anodes. Coverage inside hollow articles is thorough, although the deposit will be somewhat thinner than the plating on external surfaces.

Thickness of the deposit does not affect maintenance of the correct relative amounts of tin (65 pct) and nickel (35 pct). And this constancy can be held within two percent or so even if the content of either metal in the electrolyte varies as much as 20 or 30 pct.

Metal costs are comparable to nickel plating.



TIN-NICKEL plates inside cylinders without special anodes, gives pleasing, solderable finish.



PLATED ALLOY gives precision gears better frictional qualities, good oil wettability.

Cost of solution maintenance is low in comparison with nickel baths using expensive addition agents. And it is often possible to plate completely with a single deposit, eliminating the cost of undercoats.

The deposition rate is conveniently high: at 25 amps per sq ft the solution will deposit 0.0005 in. in 15 minutes. Cathode current efficiency is approximately 100 pct.

For still tank plating six volts dc is sufficient. Barrel plating requires 9 to 12 v. dc.

No special cleaning needed

Graphite, nickel or heavily nickel-plated coils or immersion heaters may be used to heat the solution. Recommended temperature is 155°F, $\pm 5^\circ\text{F}$. Exhaust ventilation is necessary.

No special cleaning methods are needed to prepare work for plating. But undersurface texture is important since the deposit will be no brighter than the surface of the basis metal.

While throwing power is excellent, highest quality deposits result from wide anode to cathode spacing. Work should be supported so that any tendency toward edge-burning is minimized.

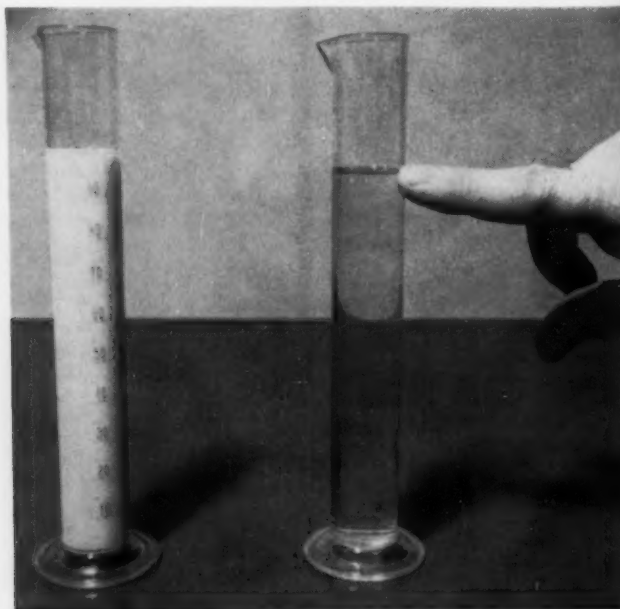
Anodes should be bagged, preferably with nylon. And only nickel with minimum carbon content should be used for anode purposes.

Nominal composition of the plating bath is shown in an accompanying table. A recommended schedule for checking the solution is: daily for pH control, weekly for fluorine content and every two weeks for nickel and stannous tin.

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Better finishes, too—

Coolant Switch Increases Machining Speeds, Tool Life



SOLUTION of synthetic cutting fluid (right) is transparent. Soluble oil emulsion is cloudy.

♦ Search for ways to boost machining speeds, achieve better finishes, get longer tool life can take many paths . . . Cutting fluids fit into one area of investigation—and it can be an important one.

♦ This firm switched to a new synthetic cutting fluid a year ago . . . Benefits were apparent immediately . . . Speeds went up by 50 pct in some cases . . . Despite faster rates, tool life virtually doubled.

By CARL SEABURG, Superintendent,

Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

♦ A SEEMINGLY simple thing—the choice of a cutting fluid. But it can have a far-reaching effect on productivity and profits.

Watson-Stillman Fittings Div. of H. K. Porter Co., Inc., switched to a different cutting fluid at its Roselle, N. J., plant about a year ago. Results: An overall increase in machining speeds (up to 50 pct in some cases) and tool life virtually doubled.

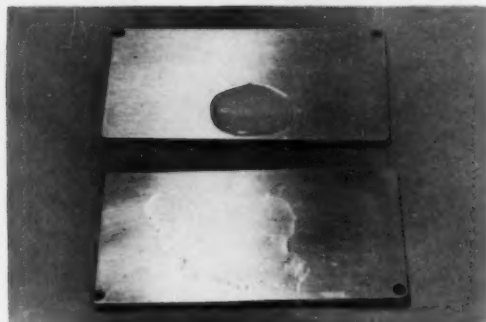
The firm makes a complete line of pipe fittings in various sizes to accommodate a wide range of service pressures. Most are machined from carbon steel forgings, although stainless steels and other alloys are also used.

Aim is to machine all jobs as rapidly as possible, consistent with obtaining a good surface finish. Most work is done on turret lathes and automatic chucking machines. Shell's Dromus Oil E is the synthetic cutting fluid now used on both types of equipment with equal success.

Get good surface finish

Before this coolant was selected, turning, drilling, boring and reaming was done at speeds of about 60 sfpm. The change in cutting fluids permitted an increase in machining speeds without sacrificing surface finish requirements.

In fact, finishes produced at the higher speeds



Top: PIPE fitting, machined on chucker supplied with synthetic coolant, is inspected for flaws.

Bottom: SYNTHETIC coolant solution spreads out thinly (below) as indication of wetting and cooling ability compared to conventional emulsion (top).

are as good or better than those obtained formerly. And chatter marks, roughness and digging-in of tools is generally eliminated on hard-to-machine stainless steel and Monel metal.

Increased machining speeds have not shortened tool life. On the contrary, whereas bits were formerly sharpened every eight hours, use of the synthetic cutting fluid extends the interval between sharpenings to 14 to 16 hours.

Feed rates were not changed when cutting speeds were stepped up. They remain at about 0.009 ipr for a 1-in. drill and approximately 0.015 ipr for a 2¼ in. drill. Feed on turret lathes for cuts up to ½ in. depth is about 0.011 ipr.

The synthetic cutting fluid costs more than conventional emulsion-type cutting oils, but the firm finds it to be cheaper in the long run. Chief reason is that it can be used for extended periods



SINCE coolant switch was made, turret lathe machining speeds have been stepped up 50 pct.

without changing. Some of the machine tools are still using the original solution made up over a year ago. Only additions made have been to replace dragout losses.

The cutting solution prepared from the synthetic fluid is mostly water. Various ratios between the fluid and the water may be prepared for machining different metals. However, Watson-Stillman uses 30 parts water to 1 part of the synthetic fluid as an all-purpose solution. This formula proves most satisfactory for their use.

Water helps cooling action

The high water content assures efficient cooling action. This effect is helped by the fact that the cutting fluid lowers the surface tension of the water to give it more wetting power.

At the same time, the high water content of the solution does not contribute to rusting of the machines or the fittings processed. There is enough anti-rust quality in the fluid additive to prevent this.

Combination of the synthetic fluid and water forms a true solution, not an emulsion. Left to stand undisturbed for long periods, the solution will not separate into layers. In addition, it is stable at all temperatures normally encountered.

Because the solution is mostly water, it has little tendency to foam or froth, and chips settle out rapidly. Splash pans below the machines are cleared of collected chips occasionally, and make-up solution is added if necessary.

When a machine is down for major cleaning or maintenance, the coolant is syphoned off. It may be saved for re-use on the same machine or transferred to another one without losing any of its effectiveness. All in all, the net result has been a superior product at lower cost. Also, tools last much longer than previously.

Good Control Makes Titanium Welding A Shop Tool

♦ Titanium weld-fabrication in mass production still presents difficulties to metalworkers large and small . . . This practical Westinghouse report on its own massive test program sheds light on a host of previously puzzling problems.

♦ Even in high volume line setups, ductile titanium joints with high yield strength are possible . . . Tungsten arc welding plus conventional tooling provide necessary controls . . . Scrap loss drops as metal utilization improves.

By F. D. SEAMAN, Metallurgical Supervising Engineer,
Aviation Gas Turbine Div., Westinghouse Electric Corp., Kansas City, Mo.

♦ AVOID ATMOSPHERIC contamination, and you can mass produce ductile titanium joints successfully with conventional tools. An extensive, recently completed test program at Aviation Gas Turbine Div., Westinghouse Electric Corp., Kansas City, confirms this.

To adapt titanium to current high volume production processes, control (1) undesirable effects of some gases, (2) the metal's reactivity with certain materials, and (3) heat embrittlement (in some alloys only).

There's no longer any reason for excessive titanium scrap with regulation of these three factors.

Yield strength generally indicates titanium's weldability, at least in the unalloyed metal. By working with titanium low in nitrogen and oxygen content, the careful operator consistently welds sound and ductile joints in material of 70,000 psi yield strength and less.

In unalloyed titanium, the higher yield strength materials indicate greater volumes of dissolved nitrogen and oxygen. These gases embrittle joints, despite careful control of the welding job to prevent contamination.

Only one currently available titanium alloy

combines good joint ductility with high yield strength—in the 110,000 psi range. This alloy contains 5 pct aluminum and 2½ pct tin. Most other alloys transform to the brittle condition on welding. Heat treatment in an inert atmosphere restores ductility in some alloys.

After exhaustive tests, inert gas tungsten electrode arc welding continues as the best and most practical current technique for joining titanium. Flash welding can be readily accomplished under carefully controlled conditions. The operator can easily resistance weld titanium, but the metal is notch sensitive and shows poor tensile and fatigue properties.

Braze too, with adequate controls

In brazing titanium, the filler metal can form a brittle phase with the base metal. Fluxes vary in their ability to promote sound, strong joints. Even pure silver filler metal requires meticulous control of the brazing cycle. Certain nickel brazing alloys can join titanium, but are limited in their scope.

Difficulty of fusion welding titanium lies in the metal's tendency to absorb oxygen, nitrogen and hydrogen from the air at temperatures



WELD TITANIUM easily in collapsible chamber. Scratches on plastic delineate top surface.

HERE'S HOW TITANIUM JOINING METHODS COMPARE

Type and Process	Ability to join titanium	Results
FUSION WELDING		
Oxyacetylene	poor	Tendency of titanium to destroy flux. Sensitivity to combination gases.
Atomic hydrogen	poor	Shielding atmosphere of hydrogen undesirable in presence of molten Ti.
Metal arc	poor	Cannot transfer titanium through the arc. Molten slag does not protect weld load.
Submerged arc	poor	Flux does not provide adequate shield.
Inert gas tungsten electrode	best	Will work but requires extra shielding.
Inert gas consumable electrode	fair	Need development.
Flash welding	fair	Successful under carefully controlled conditions.
Resistance welding	limited	Sound welds readily produced, but metal is notch sensitive and exhibits poor tensile and fatigue properties.
BRAZING WITH FLUX		
Silver (low temperature)	limited	Successful fluxes have not yet been fully developed. Brittle phase reported.
Brass	poor	Brittle phase and eutectic wash reported.
Copper	poor	Brittle phase and eutectic wash reported.
Nickel-Titanium	limited	Some alloys appear to have merit.
BRAZING IN ATMOSPHERE		
Endogas	poor	Gases absorbed into metal or form compounds which prevent metal flow.
Cracked ammonia	poor	
Dry hydrogen	poor	
Argon gas	good	
Vacuum	good	

over 1200°F. If absorption of these occur at the interstices, the metal loses ductility and embrittles at room temperatures. At arc welding temperatures, the operator must therefore protect the molten weld pool and adjacent hot metal from atmospheric contamination.

On the other hand, tests show the nominal amount of water vapor often present generally has little effect on ductility. Such vapor does decompose under the arc, but only contaminates titanium slightly if at all.

Remove heavy oxide films on the base metal or on adjacent metal surfaces in the heating zone prior to joining.

Surrounding the heated metal with a blanket of argon or helium offers the major means of avoiding contamination. The protective atmosphere must be at least 99.75 pct inert gas. Welding grade argon or helium mixed in any proportions satisfies weld requirements without further preparation.

Chill the weld and adjacent metal rapidly following the joining operation. This cooling helps cut absorption of gases from the air. It also keeps heat distortion to a tolerable level in most cases.

Welding in an enclosed inert gas chamber effectively shields titanium from atmospheric contamination. Use of a collapsible chamber gives more consistent and less costly results than open welding techniques. However, the purging job consumes a considerable gas volume.

Small parts load into such chambers in large numbers, making this method economical for mass production. Favor the chamber where a backup chill is impossible, e.g., with complex parts or blind welds.

After work is placed inside a flexible chamber, collapse its walls to their minimum volume. This removes most of the air. Fill with inert gas a second time, and again collapse the chamber, displacing still more air. Recycle until a sample weld shows less than one pct air remaining. For bulky parts, recycle six or more times.

Avoid use of porous (brick, cloth, etc.) chambers. They can hold air, later released slowly into the purged volume. This increases chances of weld contamination.

If part design necessitates open welding of titanium, join either manually or with auto-

WELDABILITY COMPARISON OF VARIOUS TITANIUM ALLOYS

In assembling test data leading to the following evaluation, every effort was made to preserve standard conditions. Standard bend tests helped form basis for conclusions on ductility.

Alloying Elements	Trade Designation	Fusion Welding Characteristics
Alpha Series (Alpha after slow cooling)		
Unalloyed—Special purity	"Iodide Titanium"	All may be welded. Ductile joints are produced, provided precautions are taken to exclude O ₂ , N ₂ and carbon
Unalloyed—55,000 psi yield strength	A 55 RS 55	None can be considered high strength structural materials.
Unalloyed—65 to 75,000 psi yield strength	A 70 RS 70 Ti 75A MST, Grade III	
Unalloyed—100,000 psi yield strength (high O ₂ , N ₂ content)	Ti 100A	
6 pct Al, 2.5 pct Sn	A 110AT	Combines good joint ductility with highest strength in alpha group: 110,000 psi vs 70,000 psi yield strength for other weldable alpha alloys

matic equipment. A nozzle about 50 pct larger than normal assures an adequate blanket of inert gas surrounding the weld.

Inert gas should flow through the oversize nozzle at about 12 cph. A lesser gas volume often permits weld contamination through poor coverage. Excessive gas can introduce air into the molten weld through turbulence.

A secondary nozzle (or trailer) sometimes helps where large heated areas are involved. This fits behind or around the regular torch nozzle. Watch trailer design, however, or turbulence troubles begin. If present, turbulence most likely will originate either in the gap between the nozzle and trailer, or from the jets of gas shooting into the trailer hood.

Control warpage with backup

Employ a proper backup fixture to control distortion and to minimize the shielding problem. In most cases, inert gas feeds through manifolds in the backup to the underside of the weld. Avoid grooves in backups deeper than one sheet thickness of the material to be welded. Locate gas manifold holes about 3 to 4 in. apart.

Large manifold volumes complicate the job of displacing air with a flow of inert gas. Design holes and grooves as small as is consistent with desired gas flow.

Bend tests show that backup bars enable consistent production of welds more ductile than possible without use of such equipment.

Increase currents for welding titanium up to 50 pct greater than those for an equivalent

Alpha-Beta Series (Alpha-beta after slow cooling. Rapid quench produces alpha prime plus beta.)		
1.5 pct Al, 3 pct Mn*	RS 110BX	Welding produces the very brittle quenched structure, which is not relieved either by present heat-treatments or slow cooling of the weld
4 pct Al, 4 pct Mn	C 130AM RS 130 MST 4Al-4Mn	
3 pct Al, 5 pct Cr	MST 3Al-5Cr	
5 pct Al, 2.7 pct Cr, 1.3 pct Fe	RS 140X	
8.5 pct Al, 1.5 pct Cr, 1.5 pct Fe, 1.5 pct Mo	Ti 155A	
6 pct Al, 4 pct V*	MST 6Al-4V C 120AV Ti 140A	
2 pct Cr, 2 pct Fe, 2 pct Mo	Ti 150A	
2.8 pct Cr, 1.5 pct Fe, 0.2 pct O	Ti	
Beta Series (Beta after quenching. Alpha plus beta after slow cooling.)		
4.5 pct Cr, 4.5 pct Fe, 4 pct Mo	Ti 150B	Ductile joints produced change to brittle joints under operating stresses and temperature. Base metal somewhat more dense than other alloys with little if any gain in strength
7 pct Mn	RS 120	
8 pct Mn	C 110M	
3 pct Mn, 1 pct Cr, 1 pct Fe, 1 pct Mo, 1 pct V	MST 3 Mn complex	
Code:		
Prefix	Number	Suffix
Ti—Titanium Metals Corp. A or C—Rem-Cru Corp. RS—Republic Steel	yield strength yield strength yield strength	production series alloy abbreviation production series (X indicates experimental)
MST—Mallory-Sharon Titanium Corp.	alloy content	

Starred (*) alloys have limited weld ductility

steel joint. Titanium's low thermal conductivity is partly responsible for this higher figure. Chilling action of the backup contributes also to need for increased currents.

Straight polarity direct current produces the best weld. Butt-welding tests with reverse polarity dc proved unsatisfactory. Incomplete weld penetration in 0.050 in. titanium resulted from passes at settings from 30 to 100 amp. Electrode burnoff also occurred.

Since alternating current is not believed to hold any advantages, it was not tested.

With the higher amperages, employ a torch speed equivalent to that required for stainless steel. Lower amperages do weld satisfactorily, but the slower pass speeds then tend to increase warpage and also to tire the operator.

Avoid too rapid torch motion, as well as movement of the workpiece. Turbulence may introduce air and contaminate the weld.

Use of a short arc achieves the best manual welding results. Work with an arc so short the tungsten electrode almost touches the molten pool. Even if the electrode should actually meet the work, tests indicate no harmful effects from tungsten contamination.

In joints thicker than 0.090 in., a special heating technique helps produce sound joints. Move the arc ahead about 3/4 in., then back about 1/2 in. A heavily convoluted bead surface results.

As in stainless steel, full weld penetration shows in a pointed appearance of the tail of the weld pool. Substandard penetration produces a flat or perhaps even notched tail.

Low Carbon, Low Nitrogen Improve Stainless Properties

♦ Vacuum melting helps provide stainless alloys with a variety of improved properties . . . But vacuum melting alone is not the answer to higher rupture strengths, creep resistance, and optimum ductility.

♦ Carbon and nitrogen contents are highly critical factors when it comes to improving elevated temperature properties . . . Differences as small as 0.002-0.004 pct take on a practical, as well as theoretical importance.

By F. C. MONKMAN, Director of Research, Walworth Co., Boston
and N. J. GRANT, Associate Professor, Dept. of Metallurgy,
Massachusetts Institute of Technology,
Cambridge, Mass.

♦ VACUUM MELTING promises to provide high temperature alloys with greater uniformity, strength, and stability. Some of its potential for metal improvement has already been demonstrated in a number of alloy systems. In general, the improvement in properties is a result of the smaller amounts of gaseous and low melting impurities or tramp elements which usually concentrate at the grain boundaries during solidification.

Recent tests indicate the superiority in rupture strength, creep resistance, and ductility of two low-carbon-nitrogen stainless steels over vacuum melted alloys with higher carbon and nitrogen contents. The results, obtained by the Dept. of Metallurgy, Massachusetts Institute of Technology, show that these high purity steels—although free of stabilizing elements—are superior even to commercial stabilized Types 347 and 321 at 1300°F.

The compositions of the alloys tested vary from 15.6 to 19.4 pct in chromium content with a corresponding variation in nickel content ranging from 10.4 to 8.0 pct. The wet chemical results for test heats are shown in Table I, along with oxygen values obtained by vacuum

fusion. Table II shows spectrographic values for a number of trace elements of interest.

As solution treated structures and the M_s temperatures as determined by resistivity measurements are listed in Table III. Alloys 1 and 2, provided by Utica Drop Forge and Tool Co., were melted together in a vacuum. Alloy 1 was vacuum cast and then nitrogen was admitted to the system before casting Alloy 2. In this way, the only significant difference between the two alloys (aside from variation in chromium content due to volatilization) is in the nitrogen content.

Bubble helium through melt

The other three vacuum melted alloys were obtained from National Research Corp. The relatively low carbon and nitrogen values for Alloy 6, which was air melted, were obtained by bubbling helium through the melt and by adding iron oxide so as to obtain a good carbon boil.

This air-melted heat was deoxidized with a calcium-manganese-silicon alloy prior to casting. The ingots from the vacuum melted alloys weighed from 5 to 10 lb, while the ingot of Alloy 6 weighed 25 lb.

Fig. 1

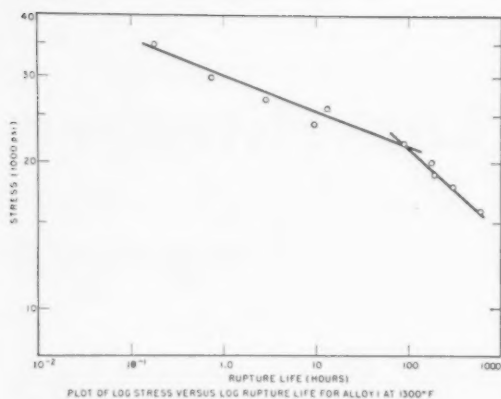


Fig. 2

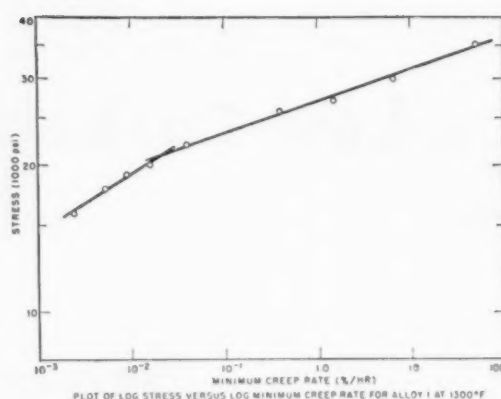


Fig. 3

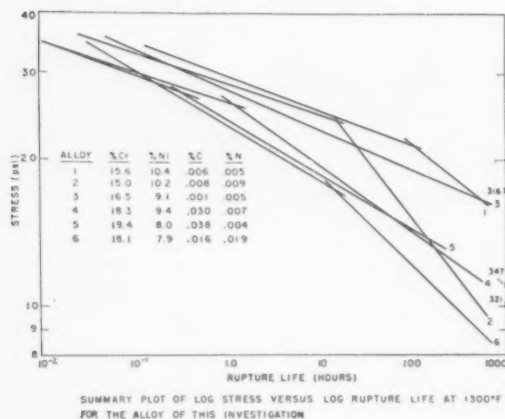
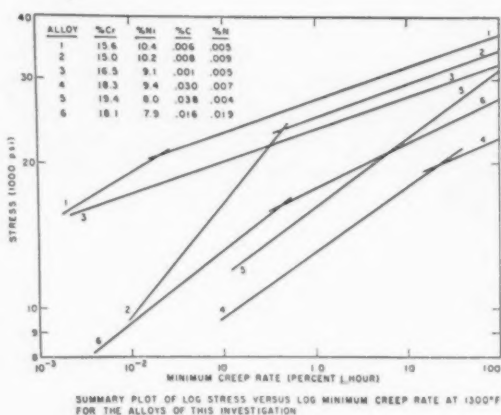


Fig. 4



The alloys were forged to 1/2-in. diam rods at a maximum temperature of 2200°F. The bars were then solution treated for 1/2 hour at 2000°F and water quenched. Stress rupture test specimens were machined from these rods to a gauge section 0.250 in. in diameter and 1 in. long.

All stress rupture tests were run on equipment which more than adequately meets ASTM specifications. Specimens were run at stresses which resulted in rupture lives from about 30 seconds to 1000 hours at 1300°F. Reduction in area values at the point of fracture and elongation values over the 1-in. gauge section were measured for each test in addition to plotting the entire creep curve.

Selected broken specimens were examined metallographically to determine any structural changes which might have occurred during testing. Various etching techniques were used to identify the phases present in the alloys before and after testing.

X-ray diffraction studies were made with a Norelco spectrometer to identify the phases present. Since these alloys were found to contain martensite, the formation and decomposition temperatures of this phase were investigated by means of resistivity measurements using a Kelvin Double Bridge. These results were further

substantiated by X-ray diffraction studies at the various temperatures using a high temperature X-ray camera.

Plots of log stress versus log rupture life and log stress versus minimum creep rate for Alloy 1 are presented in Figs. 1 and 2. Such plots were obtained for each of the alloys. To avoid confusion, they have been omitted and only the summary plots are presented in Figs. 3 and 4.

Obtain ductility values

The high temperature strength and ductility values for each alloy were also obtained. The best curve through the points was drawn on the basis of the rupture and creep data supplemented by metallographic examination of the broken test specimens.

The strength values of Alloys 1 and 3, which have the lowest carbon plus nitrogen contents, were found to be significantly higher than those of the other alloys. The 1000-hr strengths of Types 347, 316, and 321 stainless are also included in Fig. 3. Alloys 1 and 3 are considerably stronger than either the columbium or titanium stabilized 18 pct Cr-10 pct Ni steels (347 or 321). They are almost as strong as Type 316 which contains 2-3 pct molybdenum.

In view of the sources from which Alloys 1

TABLE I

Composition of Alloys (In Pct)

Alloy	Wet Methods						Vac. Fusion			
	Cr	Ni	C	N	Mn	Si	S	Sn	Pb	O
1	15.6	10.4	.006	.005	—	—	.015	.004	.001	—
2	15.0	10.2	.008	.009	.01	—	.014	.003	.001	.003
3	16.5	9.1	.001	.005	.01	.03	—	—	—	.002
4	18.3	9.4	.030	.007	.01	.06	—	—	—	.006
5	19.4	8.0	.038	.004	.01	.11	—	—	—	.001
6*	18.1	7.9	.016	.019	.06	—	.014	.003	.001	.015

* Melted in air.

and 3 were obtained, it is unlikely that the high strength values of these materials are due to an unanalyzed element picked up from the crucible and missed in the chemical analysis. Extreme care was taken to determine the carbon and nitrogen contents of these alloys.

Alloy 3, however, was prepared for a separate investigation and there is some question regarding the exactness of the 0.001 pct carbon reported. Comparing the measured M_s temperature of this alloy with the calculated M_s based on the chemical composition indicates that the carbon content may be as high as 0.005 pct.

Comparison of Alloy 1 with 2 in the summary plots clearly shows the effect of nitrogen on the high temperature strength at this carbon plus nitrogen level at 1300°F. The only significant difference between these alloys is the nitrogen

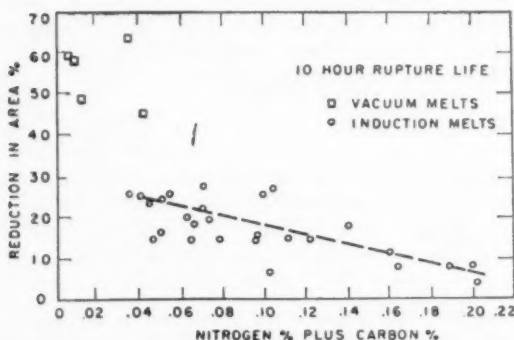
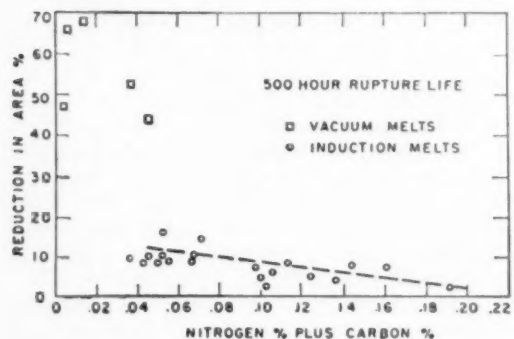
content. It is probable that the severe decrease in rupture strength of Alloy 2 is due primarily to the increase in nitrogen content.

Agree with earlier work

Comparison of Alloys 1 and 3 with Alloys 4 and 5 shows that increasing carbon at these low levels also has a detrimental effect on the high temperature strength. This is in agreement with previous work¹ in which carbon and nitrogen were found to be detrimental to the high temperature strength of 18 pct Cr-8 pct Ni type stainless steels at this composition level. This is shown in Fig. 6, which is reproduced from the previous work and on which the rupture values for Alloys 1 through 6 are plotted.

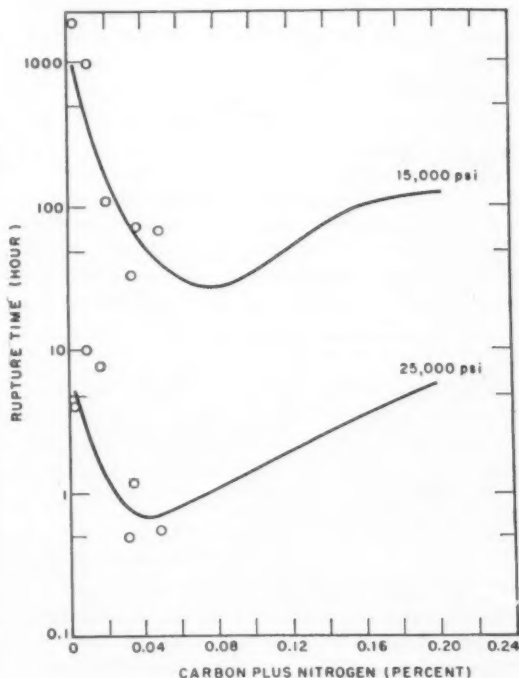
The values of reduction in area and elongation for the vacuum melted alloys, within experimen-

Fig. 5



PLOT OF REDUCTION IN AREA VERSUS NITROGEN PLUS CARBON CONTENT FOR 10 AND 500 HOURS RUPTURE LIFE AT 1300°F.

Fig. 6



CHANGE IN RUPTURE LIFE AS A FUNCTION OF CARBON PLUS NITROGEN CONTENT AT A GIVEN STRESS AT 1300°F (3)

tal error, were independent of rupture life (or stress). The ductility of Alloy 6, which was melted in air, was severely decreased with increasing rupture life in line with the behavior of higher carbon alloys.

The values of reduction in area for rupture lives of 10 and 500 hrs are plotted as a function of carbon plus nitrogen content in Fig. 5, and are compared with the reduction in area values from air melted stainless steels. The ductility of vacuum melted alloys is shown to be more than double that of air melted alloys.

The lack of embrittlement noted in these alloys as a function of increasing rupture time or decreasing strain rate is of real practical significance. Fig. 7 shows the reduction in area values for Alloys 1 (which is also representative of Alloys 2, 3, 4, and 5, for Alloy 6 which shows embrittlement, and Alloy 21 at still higher carbon plus nitrogen which shows greater embrittlement.

The most significant difference between the air and vacuum melted alloys is in the silicon and manganese contents (listed in Table I). Spectroanalysis also showed a difference in the lead and magnesium contents. What effect this difference had on the high temperature properties is not clearly understood at present. It had been previously reported that the ductility of vacuum melted M-252 was severely reduced by the additions of silicon and manganese.

The structures of the alloys after the solution treatment are shown in Table I. All of the alloys contain martensite. In every case, the martensite was found to decompose completely by 1300°F, so that the alloys consisted of austenite or austenite plus delta ferrite at 1300°F prior to testing.

TABLE II

Alloy	Composition of alloys—Minor elements—Spectroanalysis parts per million				
	Mg	Pb	Be	Sb	Sn
1	2	300	←not detected→		
6	15	500	←not detected→		

The decomposition of delta ferrite was followed metallographically in Alloy 4. Based on etching techniques, the delta ferrite in this alloy appeared to transform into sigma and carbides. These alterations did not seem to reduce the ductility of this alloy.

See ferrite precipitate

In the case of Alloys 1, 2, and 3, the carbon plus nitrogen content is below the equilibrium solid solubility of these elements at 1300°F. Therefore, the grain boundary precipitate observed is either ferrite or sigma. From etching characteristics, it is thought that the precipitate is ferrite.

Fig. 7

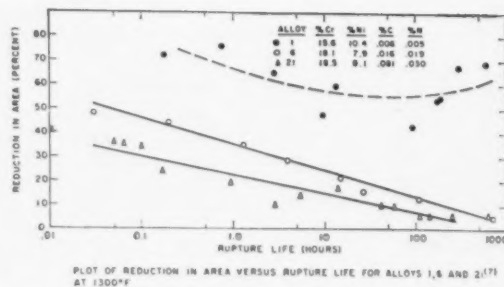


TABLE III

Alloy	Phases	Structure after solution treatment and M ₂ temperature
		M ₂ (by resistivity)
1	austenite, martensite	225° F
2	austenite, martensite	
3	austenite, martensite	56
4	austenite, martensite, delta ferrite	-10
5	austenite, martensite, delta ferrite	-25
6	austenite, martensite, delta ferrite	50

The grain boundary precipitate in the remaining three alloys is thought to be a combination of carbides, nitrides, and ferrite since the carbon plus nitrogen content of these alloys is greater than the equilibrium solid solubility at 1300°F.

The growth of ferrite at the grain boundaries of air melted stainless alloys has been found to result in an instability break in the log stress versus log rupture life and log stress versus log minimum creep rate curves. Figs. 3 and 4 show that instability breaks were found in all the alloys except Alloy 3. These breaks may be due to the growth of ferrite at the grain boundaries.

The rupture strength, creep resistance, and ductility of two low-carbon-nitrogen stainless steels have been found to be superior to other vacuum melted alloys with higher carbon and nitrogen contents. They are superior even to commercial Types 347 and 321 at 1300°F.

The ductility of the vacuum melted alloys was found to be independent of the rupture life and from two to four times that of similar stainless steels which had been air melted. Also, the ductility of these alloys does not decrease with increasing rupture life at 1300°F.

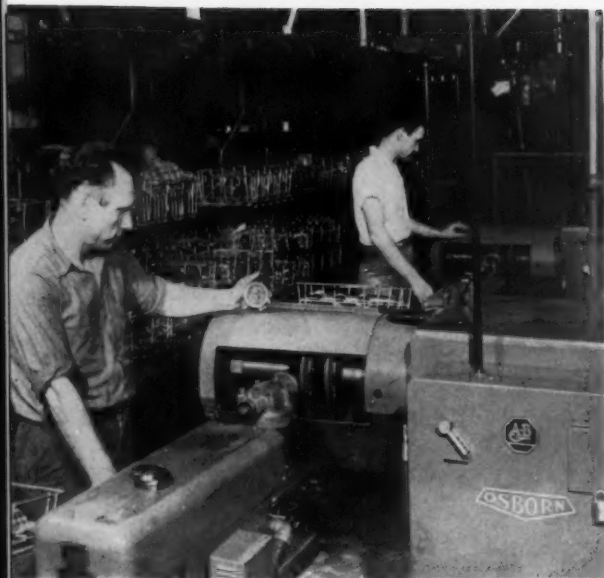
REFERENCE

Hum and Grant, N. J.: "Austenite Stability and Creep Rupture Properties of 18-8 Stainless Steels," Trans. ASM, 45 (1953), p. 105.

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Debursrs automatically—

Power Brushes Integrate Finishing Into Shop Line



SEVEN SECOND deburring of pump gears blends surface junctures. Reversible motor boosts brush life.

♦ **TRY INTEGRATING** power brushes in your shop line, and watch production bottlenecks shrink. You'll find brushes lend themselves well to either high or low volume manufacture of both comparably small and large parts. This contrasts to the situation even a short time ago, when power brush equipment was essentially a wire or fiber brush driven by a motor.

Now attention to design enables tailoring power brush setups to fit individual production lines. Within wide limits, power brushes can make real contributions to your automatic or semiautomatic manufacturing facilities.

Where complex contours previously called for hand grinding, expect an immediate drop in labor costs. Tolerances present no problem. Equipment adjusts easily to remove burrs, to blend and finish surfaces within 0.005 in. or less. On short runs earlier requiring manual finishing, power brushes show off their versatility by handling job after job, each lot differing, with little setup time.

Debursrs heavy workpieces

One such power brush installation accommodates workpieces up to 19 in. diam and 100 lb total weight of part and fixture. This 100 lb limitation varies somewhat according to extended length of the part from the bearings of the work holder head. Maximum weight thus decreases or increases as part lengths change.

Cross feed adjusts 6 in., and in feed 10 in. Work holder head swings horizontally through 220° and vertically through 240°.

Another machine, also built by Osborn Mfg.

Co., Cleveland, accommodates two interchangeable brushing head combinations used in conjunction with a vertical-spindle rotating work table.

The L-type brushing head attaches to the rotary work table. It combines manual, pneumatic and electric controls, contributing to production flexibility. The head rotates 360° vertically, 135° horizontally.

Spindle movement is pneumatically controlled by a 6 in. vertical reciprocating stroke and a 3 in. horizontal reciprocating stroke. Both these integrate into the automatic operation cycle, through electrical controls.

The alternate (O-type) brushing head ties into the rotating work table electrically, but is physically independent of it. Power adjustment moves brushes vertically and lineally through 33 in.

T-slotted rotating work table holds jigs and fixtures up to 26 in. diam at an over-all table height of 38½ in. Variable speed motor adjusts table rotation between 1 and 9 rpm. Work table can support up to 3500 lb.

With L-type brushes, parts to 48 in. diam are finished. O-type heads accommodate parts of almost any diameter, since they are independent of the work table.

Aircraft fabricators find power brushing solves deburring and surface finish problems. List of jet engine parts now brush-finished extends through turbine blades, shrouds, spacer rings, nozzles and diffusers. You'll find these parts make up components of the J-47, J-57, J-65, J-71, J-75 and the J-79 jet aircraft engines.

Replace Furnace Faster By Off-Site Construction

◆ There come times when even your busiest equipment must be replaced in the same location without regard for downtime . . . But sometimes, careful preplanning can cut the time lost in switching over to surprisingly low levels.

◆ Consider, for instance, how Granite City Steel trimmed 4 to 6 weeks off the time they'd normally have lost in replacing an old blast furnace with a new one of twice the capacity . . . Partial prefabrication was the answer, then a giant moving job.

◆ REPLACING any kind of continuous-operation equipment involves a certain amount of productive downtime. This is particularly so where the new equipment must go in the same physical location of the old. Almost always, though, careful pre-planning can help to make the switchover considerably less painful in terms of lost production time.

An extreme example of what can be accomplished by careful pre-planning is shown by a mammoth changeover recently completed at Granite City Steel Co., Granite City, Ill.

The item replaced: a blast furnace.

Granite City Steel's problem, in replacing the furnace, was to hold downtime of the furnace—from the blowing-out and tearing down of the old unit to the blowing in of the new—to an absolute minimum. To do this, Koppers Co., Inc., the contractor, decided on an off-site construction method used only three times previously in the steel industry. The furnace shell or stack and parts of the filling and gas removal apparatus at the top were built on a steel platform 38 ft high, located 84 ft from



NEW FURNACE SHELL rises while old "A" furnace it will replace, showing hazily in background, continues producing pig iron for openhearth.

the foundation of the old furnace equipment.

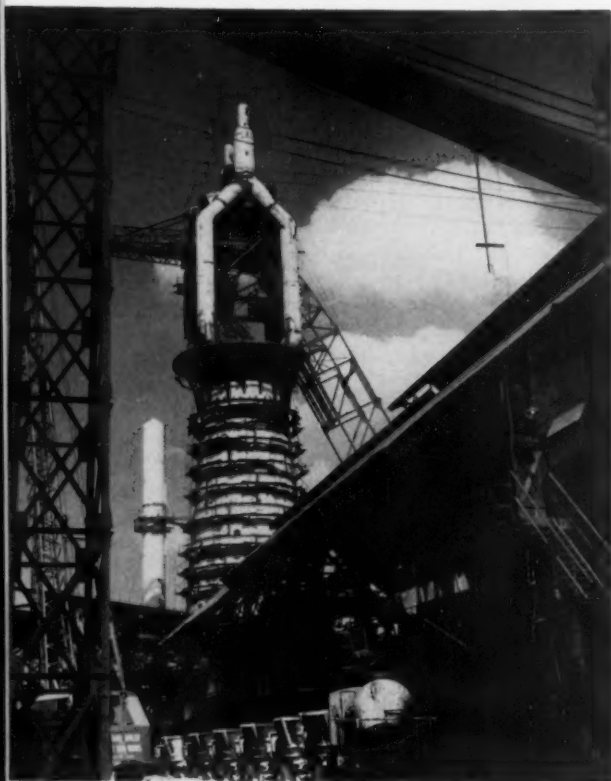
During these early stages, the old furnace (put into operation in 1921) continued to turn out iron for seven open-hearth furnaces.

Late in February, the "A" furnace was blown out and dismantled. While the foundation of the old furnace was rebuilt and the hearth of the new furnace was built, work continued at the separate site on the shell of the new furnace. Thus when, normally, construction of the new shell would have just been beginning, it was instead ready to move into place.

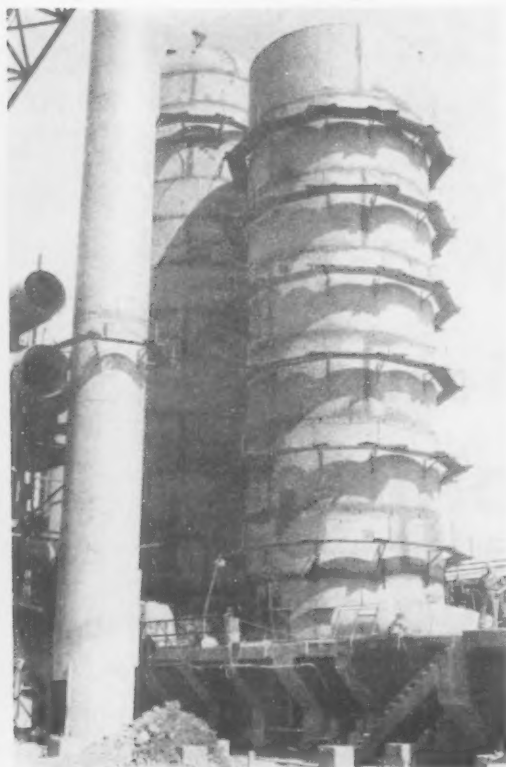
Shell moved on rollers

Early in May, the time for moving arrived. Eichleay Corp. of Pittsburgh handled the tricky job of moving the 635-ton, 172-ft-high furnace shell over the horizontal distance of 84 ft, then lowering it 3 ft onto its new steel foundation columns.

The transfer was made on steel rollers. One four-sheave block was attached to the shell near its base, another on the opposite side of the foundation. Blocks were connected by



HERE, new furnace shell has reached halfway mark in journey to location on old furnace site. Entire moving, lowering job took about 13 hours.



TWO of new furnace's three stoves and an elevator shell (left foreground) were also under construction with blast furnace shell.

eight strands of $\frac{3}{4}$ in. steel cable, and the leading edge of each cable was run to the two drums of a diesel-driven crawler crane.

A steel trestle connected the platform on which the furnace shell was built with the furnace foundation.

In all, it took one hour and 57 minutes to move the shell the 84 ft distance. Eighteen 100-ton jacks were used to lower the shell onto the tops of the furnace columns. The shell had to be in perfect alignment with the tops of the columns, which are 14-ton H beams that rise in a circle from the foundation. This part of the operation took about 11 hours.

The installed shell will be lined with about 725,000 bricks.

From the bottom, looking up, the shell consisted of the following parts when it was moved: (1) The mantle, an annular ring made up of heavy steel plates and angles to support the weight of the stack above it on the H beam foundation columns; (2) the stack, a 73.5-ft-high cone of welded steel plates; (3) the gas uptake pipes which are 5-ft 9-in. in diam and

connect to the top of the stack, and (4) the bleeder stacks, tall vertical pipes above them. The 14.5-ton bleeder stacks were raised 184-ft 8-in. by crane to be welded in place.

Also at the top of the stack was an out-rigger trolley and the upper part of the skip bridge, or tracked incline up which the skip hoists travel to dump their contents.

Two of the blast furnace's three stoves were already built at the time the transfer was made. These bricklined steel cylinders are 25 ft in diam and 104 ft high. Much of the gas-cleaning apparatus was also near completion.

The new blast furnace has a hearth diameter of 25 ft and will have a daily production capacity of 1200 tons of pig iron—twice that of the furnace it replaces. It will be 229-ft 4-in. in overall height. It's one of two blast furnaces slated for completion in the U. S. this year, and is a major part of Granite City Steel's expansion program. This is aimed at increasing ingot capacity by about 30 pct by early 1958.

Blowing in of the transplanted furnace is scheduled for sometime in July.

Ten-second operation—

Waist-High Setup Speeds Drilling, Reaming



TWO TWIN-SPINDLE machines finish ream and drill 2500 diecast aluminum housings in 8-hr shift.

♦ VERTICALLY clamped workpieces facilitate finish-reaming and drilling aluminum gear covers in a flat 10 seconds each. Two twin-spindle machines turn out 2500 diecast housings to close tolerances in a normal 8-hr shift at the St. Joseph, Mich., plant of Whirlpool-Seegar Corp. Covers form part of gear case assemblies on Whirlpool and Sears-Kenmore automatic home laundries.

Waist-high positioning of the clamping plate contributes to the high production speeds. This manufacturing technique permits rapid loading and unloading by hand, and avoids need for specialized automatic handling equipment on an essentially simple operation.

In this case, the operator swings from the conveyor table directly to the vertical fixture in the smooth, effortless arc of efficient motion. Guide pins protrude horizontally from the jig to eliminate needless fumbling and production pileups.

After positioning the diecasting vertically, hands of the operator sweep down simultaneously to grasp paired, quick-acting toggle clamps. A twist to each clamp, and the diecast housing is ready for drilling and reaming.

Each of the Excello machines powers twin horizontal spindles, geared individually from the drive shaft. One spindle on each machine mounts a reamer, the other a drill. Bushings affixed to the rear of the vertical plate guide the four tools into the aluminum diecasting.

Heads retract automatically

On pressing two start buttons, spindles on both machines advance simultaneously. Two $\frac{3}{8}$ -in. holes produced in the diecasting operation are reamed to finished size. Two 15/64-in. holes nearby are through-drilled. Hole axes are perpendicular to the flat face of the housing. All four heads automatically retract on hitting a limit switch at completion of the operations.

Light compression coil springs surround the two guidepins. When the operator unclamps the gear cover, these springs push the machined workpiece outward, but not off the pins.

In manual unloading, the operator again minimizes waste motions. Smooth, uninterrupted movements carry through placing the completed housing on a nearby table, and back to loading the housing to follow. In the few seconds while the machines drill and ream, the operator moves the next casting to a narrow worktable beneath the vertical fixture.

High speed necessitated by production requirements could sag dangerously if any one of these energy-saving manufacturing shortcuts miscued or fell out of sequence. Even in regular gaging of workpiece holes, motion is economized. To avoid delaying the machining operations, gages fit into a makeshift retainer clamped within arm's reach adjacent to the fixture face.

Weirzin's tightly bonded zinc coating takes the deepest draws with ease—does not crack, peel or flake under the severest fabricating operations.

Weirzin's malleable zinc coating lubricates dies without leaving a zinc deposit—reduces die maintenance—increases die life.

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New Technical Literature:

Catalogs and Bulletins

Cat electric sets

"Cat Electric Sets for Power and Protection" is the title of a new 16-page booklet just published. It shows many of the different kinds of uses for this company's versatile power plants. Some of the reasons why they are especially well suited to the applications are listed. Illustrated with pictures of actual installations, booklet pictures Caterpillar Generators and shows advantages they provide in compactness, and ease of operation and maintenance, reliability and power output are discussed. Copies of the booklet in English, French, Spanish and Portuguese may be obtained. *Caterpillar Tractor Co.* For free copy circle No. 1 on postcard, p. 81

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 81.

Mounted wheel speeds

Mounted Wheels, a 36-page booklet, has been issued with first time information on maximum operating speeds. Prior to this issuance an operator was required to compute maximum operating speeds by using "critical speed" information.

The eight maximum speed tables contained in the booklet are designed to facilitate correct application. They are said to eliminate confusion which occurred when speeds other than safe maximum operating were listed. It contains rules for safe and efficient operation and information on standard sizes of mounted wheels together with standard mandrel sizes applicable for each. There are three pages of silhouette drawings of the popular standard sizes of mounted wheels. *Grinding Wheel Institute.* For free copy circle No. 2 on postcard, p. 81

CO₂ analyzers

Four-page color catalog contains photos of the different types of one firm's chemically operated CO₂ analyzers and recorders. Descriptions of the operation and sampling system are accompanied by drawings. Application, principle, features, available models and standard charts of these Combustion Meters are also covered. *Hays Corp.*

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Remote weight recording

New developments that make possible the remote recording of weights in digital form are described in a new scale brochure. It says weights are no longer limited to close proximity to the scale, or to any one type of recording. Weights now travel to almost any remote location and are fed directly into tabulators, tape punches, typewriters and other office machines. Weight graduations at the scale are scanned 120 times a minute to produce a direct digital signal that is electronically counted and transmitted to the office machines selected, or stored in punched tape form for later recording. *Toledo Scale Co.*

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Perforations perplexing you?

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Resistance welder line

This six-page bulletin covers the complete line of one firm's resistance welders. In addition to its standard and semi-standard line of resistance welders, the literature describes precision specials, designed and tooled to solve specific and unusual production problems. *Precision Welder and Flexopress Corp.*

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Browning couplings

A new catalog illustrating and describing Browning couplings, consisting of rigid and flexible types which include fixed bore type flexible, bushed type flexible, bushed type rigid, bushed type chain and a new line of Minimum Bore Chain Couplings. In addition, to complete specifications on the various types of couplings, horsepower rating charts are included for convenience of selection. *Browning Manufacturing Co.*

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Manual starters

Firm's newest eight-page booklet gives new application information on G.E. manual starters for fractional and integral horsepower motors to 7½ hp. Two-color publication includes enclosure and dimension data. *General Electric Co.*

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Thermocouples

Construction and application of thermocouples and radiation detectors as used on industrial control applications is discussed in a new 40-page bulletin. Included is information on "How to Check Thermocouples," "How to Make Thermocouples," "How to Select and Size Thermocouples," plus other useful information for instrument men. Included also are standard thermocouple temperature - millivolt equivalents with temperatures being expressed on the International Temperature Scale of 1948. The electromotive force is expressed in absolute units. *Barber-Colman Co.*

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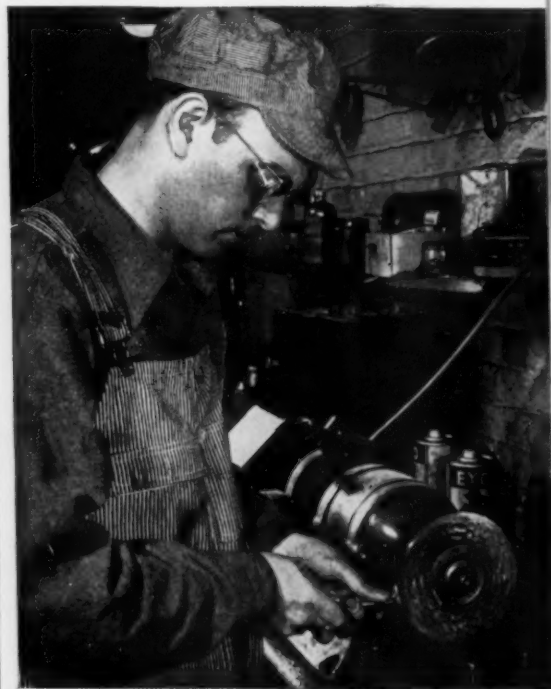


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nothing has so many uses as wire!*



NO SHATTERED WINDOWS in this factory. The hex mesh netting for plate glass reinforcement is made of annealed CF&I-Wickwire Glass Netting Wire.



SOLE SUPPORT. Millions of nails—from shoe-maker's tacks to heavy spikes—are used annually by scores of industries. Nails are made from CF&I-Wickwire Industrial Quality Basic Wire.



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FOR DRIVING SAFETY. This windshield wiper is operated by dependable, high tensile strength CF&I-Wickwire Cord Wire.

Everybody knows that steel is indispensable to today's manufacturer, today's living... yet few people realize that wire is the most widely applicable, the most versatile form in which steel is used. Here's the reason—wire lends itself to thousands of extremely diversified applications. Strength? Wire has it. Ductility? Wire is the first thing you think of. Good looks? Wire can be plated and finished in many attractive ways. On

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Whatever you make, process, or assemble, you'll find that CF&I-Wickwire Wire fits into the picture to perfection. We have the experience and the facilities to provide exactly the wires you need from plants conveniently located from coast to coast. Write our nearest sales office for complete details.

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WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

3148



Precision spectrograph

A low cost, high precision industrial spectrograph is explained in a new eight-page catalog. It gives a detailed description of the performance and applications of each of the three spectrograph models available. Included are reproductions of spectrograms made with the instrument providing an indication of its resolving power. *Jarrell-Ash Co.*

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Control equipment

Engineers and installers of piping for gas and oil burners, pumps and other related equipment should find this 20-page booklet interesting and handy. It describes the company's series of components, a high-speed, high-powered line of precision electrical and electronic automatic control equipment for all standard variables. Gives description of each device's function and method of operation. *The Hagan Corp.*

For free copy circle No. 10 on postcard, p. 81

Snap hearth furnace

Latest bulletin discusses a new snap hearth furnace which has been added to the line of standard furnaces. This new furnace is described as the first suspended hearth type with radiant tube heating. *Surface Combustion Corp.*

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Variable speed drives

Multi-color tables for quick and easy selection of variable speed "Texrope" drives have been released. In addition to providing selection tables for A, B, C and D section variable speed drives, the booklet includes information on design features, drive principles, horsepower rating tables for A, B, C, D, and E section belts, a speed range table showing the variation in rpm when using two sheaves in combination, and accessory equipment for the drive. *Allis-Chalmers Manufacturing Co.*

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Wire rope bulletin

"Wire Rope Recommendations for Industrial Services" is a bulletin covering more than 120 different types of wire ropes used in construction by bulldozers, scrapers, derricks, dragline excavators, shovels and winches; in conveyors by button, disk, can and hook units. *American Chain & Cable Co. Inc.*

For free copy circle No. 13 on postcard, p. 81

Carbide tool products

Reference catalog just issued covers a complete line of company's carbide tool products. Using dimensional drawings and specifications, the catalog describes blanks, inserts, carbide tipped tools, a new tool holder and combination cutters as well as shell end mills and twist drills. Sections which list standard grades, carbide manufacturers' grade recommendations and extensive diagrams are included. *Coromant Div., Sandvik Steel, Inc.*

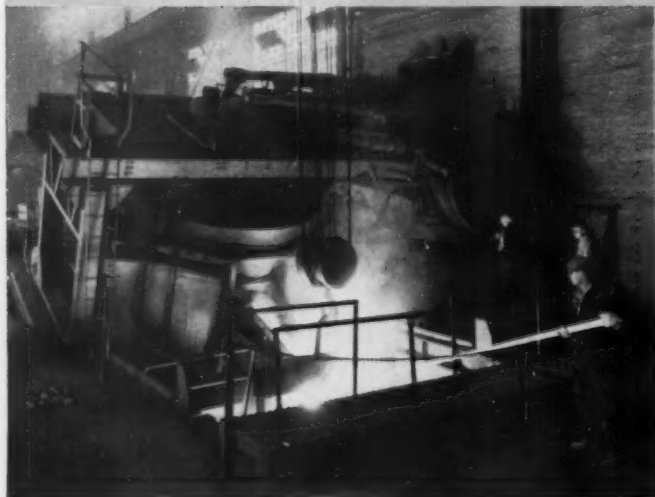
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When SERVICE Counts - Count on Ingersoll for your stainless sheets and plates

SOLID STAINLESS

HEAT-RESISTING STAINLESS
with exceptional forming qualities

IngAclad
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Whatever your needs for stainless steel sheets and plates, remember that Ingersoll specializes not only in solid stainless, but in heat-resisting alloys, and stainless-clad sheets as well.

So our recommendations are unbiased, and are based on your needs. Consult our engineers, without cost or obligation.

Write, wire or phone



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Borg-Warner Corporation
310 S. Michigan Ave., Chicago 4, Ill.
Plant: New Castle, Ind.

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 76

Shelving

Tips on how to plan installations and order shelving in more than 1000 combinations to fit any storage or supply-handling need are summarized in a new catalog. Drawings of basic units and accessories, suggested floor plans, a shelf-capacity chart and photographs of completed units make the catalog a useful guide to planned storage. The catalog information can be adapted to assembly lines, production areas, repair shops, tool rooms, aircraft maintenance hangars and business offices. Sample drawings that detail the specifications required to obtain units for any given purpose are described as removing the mystery from the planning and ordering of shelving. Write on company letterhead to *Hallowell Div., Standard Pressed Steel Company*.

For free copy circle No. 15 on postcard, p. 81

Low-cost computers

The newest in the series of one company's low-cost general purpose electronic digital computers is described in an eight-page illustrated brochure. Designed for a range of applications in scientific-engineering-research and business-industrial-financial organizations, the computer is capable of organizing, calculating and arriving at decisions. The computer is able to store and obey sequences up to 16,000 instructions, and adds, subtracts, multiplies and divides, and can calculate problems of any complexity in any desired sequence. Brochure outlines computer's features, applications and operations. A complete specification table is included. *Logistics Research, Inc.*

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Rotary retort furnace

Manufacturer's new line of controlled atmosphere continuous rotary retort furnaces for heat treating parts which can be subjected to a gentle tumbling action, is featured in an illustrated bulletin. Engineering improvements and refinements which increase production capacity and permit exacting control of processing atmosphere and temperature are also explained. *American Gas Furnace Co.*

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Welding positioner

Positioning for precision welding is done on a new machine pictured in this folder. Assemblies up to 4000 lb can be accurately positioned in a matter of seconds. Rotation for circumferential welding, it points out, is accomplished smoothly and with constant vibration-free power at exact predetermined speeds. A diagram is included along with a listing of specifications. *The Weldma Co.*

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Powder cutting-scarfing

Folder presenting iron powder processes in cutting, scarfing, gouging, lancing and washing is available. Lists applications of powder processes in steel mills, foundries, and by Metal Fabricators and Scrap Yards. Advantages of uniform flow, hotter flame, cleaner cut, sharper cut, faster burn, less smoke and less powder consumption are explained. Tells how iron powder, when introduced in controlled and prescribed amounts into the oxygen stream, oxidizes rapidly and increases the flame temperature. *Hoeganae Sponge Iron Corp.*

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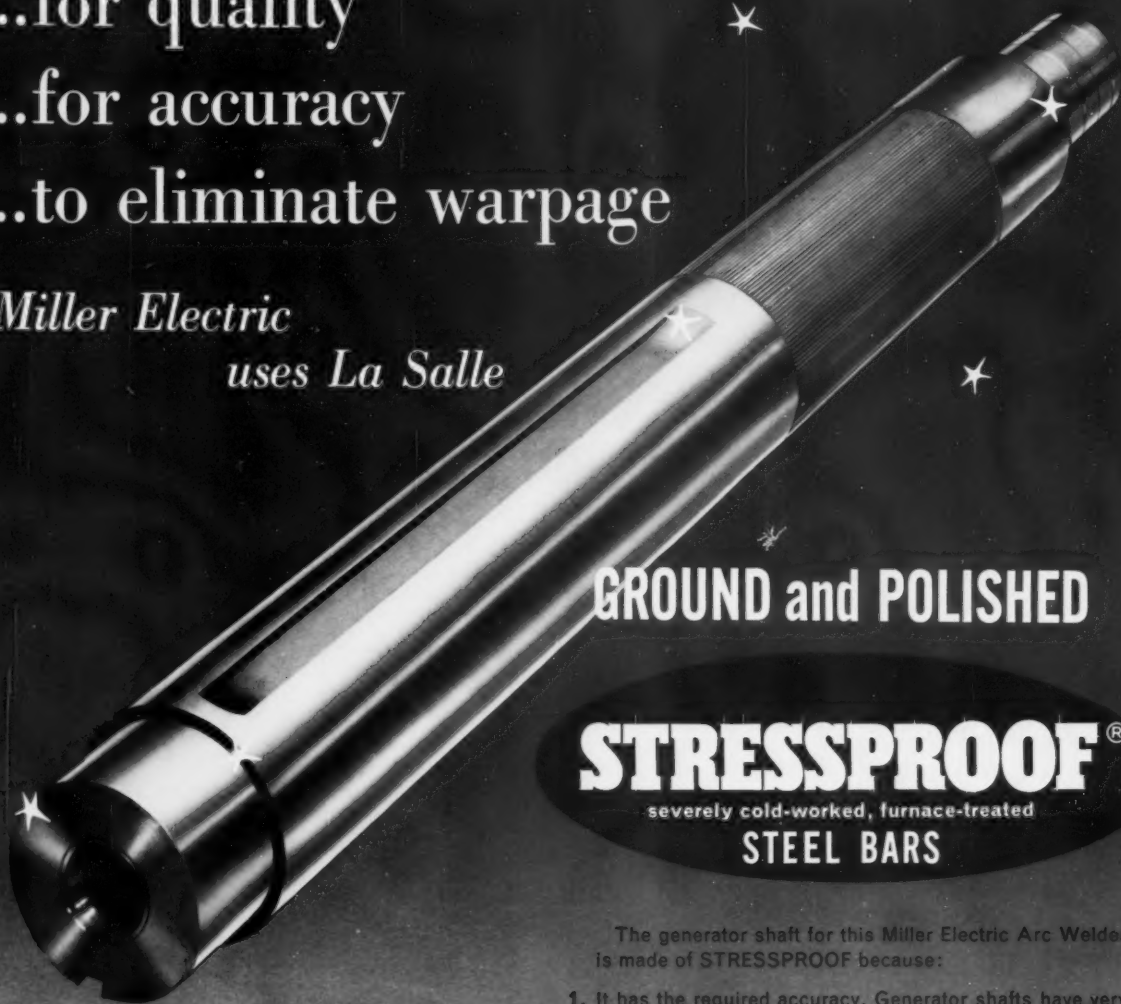
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STRESSPROOF®
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The generator shaft for this Miller Electric Arc Welder is made of STRESSPROOF because:

1. It has the required accuracy. Generator shafts have very close tolerances. When ground and polished STRESSPROOF is used, no expensive finishing operations are required. Simply machine the ends, cut the keyway, knurl and assemble.
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4. STRESSPROOF offers the increased strength without heat treating.
5. STRESSPROOF makes a better part at lower cost.

In addition to a beautiful finish and carefully controlled accuracy, ground and polished STRESSPROOF provides four important in-the-bar qualities: (1) High Strength, (2) Machinability, (3) Wearability, (4) Minimum Warp. It is available in either cold-drawn or ground and polished finish.

The outstanding quality and accuracy of ground and polished STRESSPROOF made a better generator shaft for this arc welder manufactured by Miller Electric Manufacturing Co., Inc., Appleton, Wisconsin



Get your copy of this helpful data bulletin 15

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Please send "Improve Quality—Cut Costs" booklet.



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La Salle STEEL CO.

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La Salle manufactures America's most complete line of quality cold-finished steel bars.



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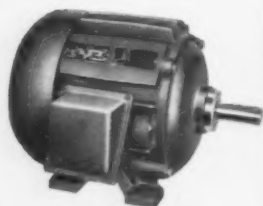
Wagner Protected Type *Industrial Motors*

lower your maintenance costs—cut down-time

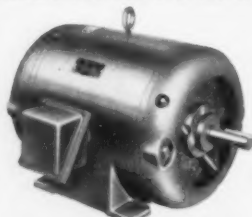
Wagner offers a complete line of protected type motors, specifically designed for use where severe conditions demand **EXTRA** protection—for bearings or windings...against corrosive vapors or abrasive dirt...in explosive atmospheres or exposed outdoor locations.

In their specific applications, each of these Wagner Motors assures completely dependable performance—with a minimum of maintenance and a maximum of freedom from costly down-time due to motor failure. Openings are provided for relubrication to greatly prolong bearing life.

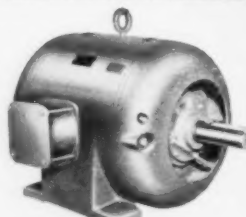
A Wagner engineer, expert on motor applications, will be glad to help you select the *right* motors for your specific needs. Just call the nearest of our 32 branch offices, or write for Wagner Industrial Motor Bulletins.



TYPE EP—Ribbed frame fan-cooled. New NEMA Frames. 1 to 30 hp.



TYPE EP—Totally-enclosed fan-cooled. Corrosion-resistant frames. 40 to 250 hp.



TYPE JP—Fan-cooled... Explosion-proof. Cast iron frames. 40 to 250 hp.



TYPE DP—Drip-proof... corrosion-resistant. New NEMA Frames. 1 to 30 hp.



TYPE DP—Drip-proof. Cast iron frames. 40 to 125 hp.



TYPE RP—Open-type drip-proof. Welded steel frames. 125 to 500 hp.

WAGNER ELECTRIC CORPORATION

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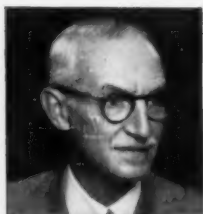


BRANCHES IN 32 PRINCIPAL CITIES

A Report from the STEEL CENTER of Mid-America



GRANITE CITY STEEL ERECTS NEW BLAST FURNACE SHELL OFF-SITE—MINIMIZES LOST PRODUCTION TIME AS EXPANSION CONTINUES



*John Marshall,
President, reports on
progress in Granite
City Steel's third
big-scale expansion
in 7 years*

"A new enlarged blast furnace is being groomed for duty at Granite City Steel in a most unusual way.

"Instead of first tearing down the old furnace and then erecting a new stack on the old foundation, we built the larger, 605-ton stack off-site on a platform 65 feet away — and moved it into place over a trestle by means of steel rollers!

"This seldom-used construction technique allowed us to hold the old furnace in operation months longer and keep our down time to a bare minimum.

"But the bigger story is in the reason behind the new blast furnace. The new furnace with double the pig iron capacity is part of an expansion program to raise ingot production another 30% — our *third* major expansion in recent years.

"As Mid-America's natural steel center, this continued expansion is our expression of faith in the industrial Midwest — and a future that looks mighty good to us."



In foreground, 171-ft. shell of new blast furnace under construction, off-site on platform. Old furnace being dismantled at right background.

GRANITE CITY STEEL

And subsidiary: Granco Steel Products Co.

Granite City, Illinois

WARD STEEL CO.

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JUNE 28

*number five in
our series*

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TO GET MORE FOR
YOUR METALWORKING
DOLLAR—PLATING

plus

METAL CLEANING
AND FINISHING
HANDBOOK

The **IRON AGE**

TECHNICAL BRIEFS

SHIPPING: Trucks On Rails

Neither train nor truck, new transport medium brings small manufacturer a trackless "rail siding", carries "boxcar" to air terminal . . . Even gives trucker a steel turnpike for vans.

Manufacturers, shippers, private car drivers and railroad stockholders are hailing a new development in transportation. It is a truck that literally "takes to the rails."

Called "Railvan," it works like this: (1) Truck-trailer picks up load. (2) Drives to R.R. pickup point. (3) Leaves trailer there, drives away. (4) Locomotive couples with number of such vans and takes them to distant city. (5) System is reversed at receiving point.

Saves Gas and Oil

Invented by the Chesapeake & Ohio R.R., the vehicle combines the truck's terminal flexibility with the train's inherent economy. Industries well off the main line are provided a "rail siding." Truck owners get an unequalled right of way while the driver is freed to pick up another load. Presumably it saves on maintenance, driver fatigue and certainly on gas and oil. Its maneuverability even allows it to receive airfreight direct from the air terminal. Spokesmen even claim that private car owners such as salesmen and leisure drivers will benefit from less crowded highways.

Railvans conform to ICC R.R. safety specifications with both tires and R.R. wheels in suspension, special couplers and buffers and rail brakes. It has lights and reflectors for highways plus ladders and a rooftop running board like a boxcar.

Arms supporting both wheel sets are attached to an outer casting of a B. F. Goodrich torsilastic spring consisting of a rubber tube vulcanized to an inner stationary tube and movable outer sleeve.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 81. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Controlling arms length achieves spring deflection for both rail and highway travel.

When operating on highways, Railvan's efficiency is penalized by the weight of the rear axle and



From truck to train or back again in only 30 seconds.

center sill necessary for track operation. However, the problem has been handled by constructing the underframe of "Cor-Ten," a low alloy, and high strength steel, and the body of aluminum.

Inner elements of the torsilastic springs are connected through a splined sleeve and an arm to the actuator screw driven through a gear train by a 90 psi air motor. This twists the spring and transfers the van from highway to rail position or back in 30 seconds. It locks in any position desired.

Atomic Energy:

Reactor development aided by zirconium producers

Use of nuclear reactors to generate electric light and power for American factories comes a step closer with announcements by two independent companies on recent zirconium developments.

A \$22,750,000 five-year zirconium supply contract between NRC Metals Corp. and AEC will boost output due to new processes developed by the corporation. It will make zirconium at nearly one-half the current market price, the company says.

Meanwhile at U. S. Industrial Chemicals Co., div. of National Distillers Products Corp., a new 1,500,000 lb per year plant was announced to produce reactor grade zirconium sponge with identical price claim: a one-half slash.

Zirconium is preferred structural metal of the nuclear reactor core. It is strong, corrosion resistant and has a high resistance to neutron absorption permitting efficient burning of nuclear fuels. It is expected to be adopted considerably in the chemical field.

"Important as Copper"

"The importance of zirconium to the nuclear industry is as important as copper to the electrical industry," said an NRC spokesman.

NRC's contract is for the annual supply of 700,000 lb of hafnium-free reactor grade zirconium. This has a high neutron capture cross section, i.e., it becomes easily radioactive. Zirconium and hafnium are nearly chemically identical.

U.S. Industrial Chemicals Co. will utilize sodium and chlorine in their process which is said to be the first semi-continuous process for making zirconium. It can also be applied to production of titanium, thorium, beryllium and hafnium. USI's process' advantages include a smaller investment to produce zirconium than by the conventional Kroll process. Liquid sodium is used which handles easier and reportedly gives a finished product of a higher purity than magnesium.

Heat Treat:

Benefits of rotary carburizing shown

Results of a hardness testing program used by Superior Steel Ball Co. to determine the results of their rotary carburizing heat treating process were recently released.

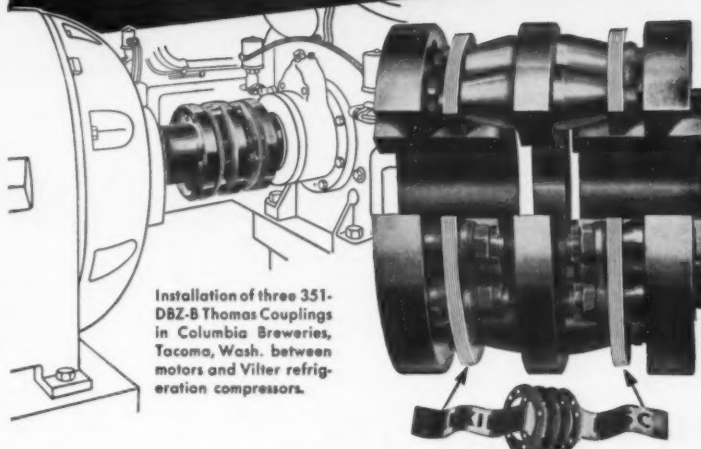
The testings represent what Superior believes to be the first

such program used in the steel ball industry.

The test was performed to determine the true nature of a rotary carburizing heat treating process used by the firm. In such a process the hardness of the metal should gradually decline from the outside shell to the core.

Balls manufactured in the regular production at Superior were cross sectioned and the hardness determined every 0.005 in.

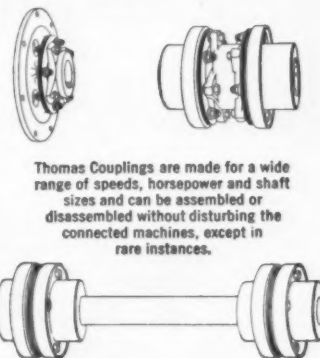
THOMAS FLEXIBLE COUPLINGS... for more years of better service!



Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

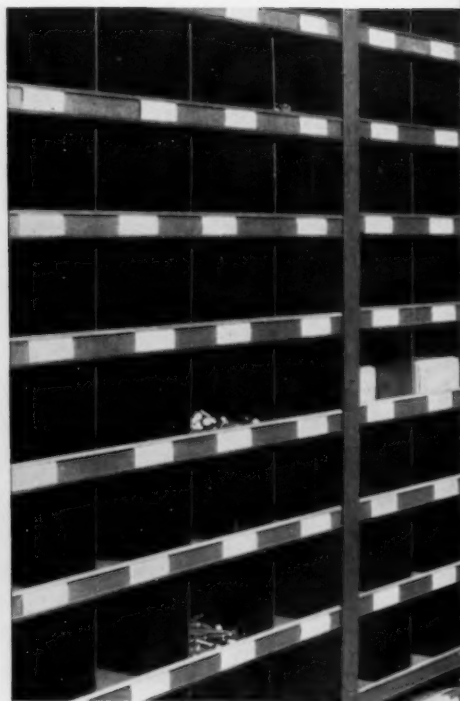
DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.



Republic Wedge-Lock Steel Shelving adjusts quickly and easily to stock changes at Sikorsky Aircraft

Parts move out of storage and into production areas *fast* at Sikorsky Aircraft Company's big Bridgeport, Conn., plant. Here Republic Steel Shelving permits a systematic arrangement of stock for immediate identification. When inventory changes occur, shelves are quickly and easily rearranged to suit new requirements. As a result, Republic Shelving never becomes obsolete.

Typical is Republic's popular Wedge-Lock Steel Shelving. Its exclusive construction forms tight, sway-proof joints, without gussets or sway braces. Shelves are free from obstructions, easy to use. A lot of inventory can be packed

REPUBLIC



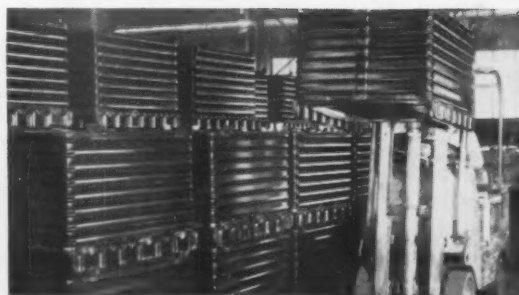
World's Widest Range of Standard Steels



Republic Wedge-Lock is extremely versatile shelving. It not only readjusts quickly to parts inventory changes, but gains strength as the load increases. In locations where overhead space is going to waste, Wedge-Lock can be stacked high and still support tremendous weights.

in a minimum of space, saving room for wide, unobstructed aisles. Yet Wedge-Lock can be quickly changed to accommodate current needs.

Republic's Berger Division, makers of Republic Steel Shelving, has been in the business of designing and fabricating quality steel shelving for more than a half a century. We will be glad to discuss any shelving problems you might have . . . or suggest ways to step up the efficiency of your storage operation. Our storage engineering assistance is available at no obligation to you. Send coupon for more information.



GET EFFICIENT MATERIALS MOVEMENT . . . and gain storage space for increased production by using Republic Materials Handling Equipment. Complete line includes all types of steel boxes, skids, pallets and stacking racks. All units are ruggedly constructed to assure long, efficient service at lowest per-year cost. For illustrated literature, clip and mail coupon, today.



SAFE MOVEMENT OF PRODUCTS AND EQUIPMENT is assured with Republic Chain. Your Republic Chain Distributor is your source for every type and size of welded and weldless chain, chain slings, attachments and accessories. Each is subject to quality control from raw ore to finished product to provide maximum reliability. Coupon will bring full information.

QUICK, EASY BACKOFF FOR READJUSTMENT is one feature of Republic's standard and special fasteners. The reason: rigid manufacturing controls to assure sharp, clean threads. Republic makes more than 20,000 standard types and sizes—over 8,000 specials. One call to your Republic Bolt and Nut Distributor gets all the fasteners you need for assembly and maintenance work. Send coupon for additional information.



STEEL

and Steel Products

REPUBLIC STEEL CORPORATION, Dept. C-1923
3104 East 45th Street, Cleveland 27, Ohio

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| <input type="checkbox"/> Wedge-Lock Steel Shelving | <input type="checkbox"/> Chain |
| <input type="checkbox"/> Boxes and Skids | <input type="checkbox"/> Bolts and Nuts |

Name _____ Title _____

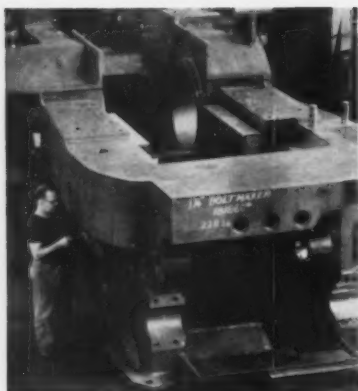
Company _____

Address _____

City _____ Zone _____ State _____

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 81 or 82.

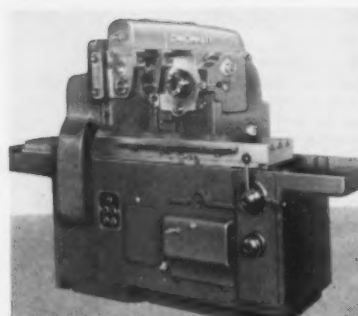


Mammoth boltmaker largest cold-forging machine

Biggest in the world is this boltmaker. It is the largest cold-forging machine ever designed. Designed for the Cleveland Cap Screw Company, the 196-ton monster stands twice as high as a man. Drawing raw stock (1 7/16 in. hot-rolled steel rod) down to size, it produces giant cap screws 1 1/4 in. in diam, 10 in. long, at rates up to 40 per minute. Screws weigh about five pounds each. They will be the largest product ever made

automatically by the cold-forging method. Largest boltmaker now is a 3/4 in. machine at only one quarter that of the new giant. The latter consumes a ton of steel every 10 minutes. Delivery of the mammoth boltmaker is expected by the year's end. Though rated to make 1 1/4 in. diam cap screws, it can be tooled up to produce screws of even larger diam. Cost: \$400,000. *National Machinery Co.*

For more data circle No. 27 on postcard, p. 81

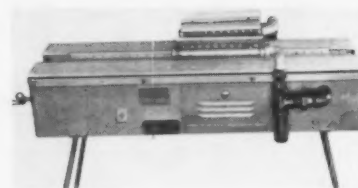


Line of automatic milling machines unveiled

Advanced production and convenience features are said to be abundant in a new line of automatic milling machines. These machines are built in plain, duplex and plain rise-and-fall styles. Much heavier and more powerful than previous models, they offer increased cutting capacity (up to 10 hp) and higher spindle speeds (up to 3000 rpm) for cutting with high speed

steel or sintered carbide milling cutters. They are built in seven sizes of each style: 24 in. table travel, 5 hp. to 96 in. table travel, 10 hp. Automatic cycles and manual maneuverability have been combined to an unusual degree for production type milling machines, says the manufacturer. *Cincinnati Milling Machine Co.*

For more data circle No. 28 on postcard, p. 81

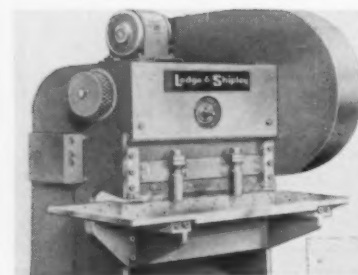


Multiflame brazing machine is firm's first

A modification of earlier, larger models, this multiflame brazing machine is the firm's first. It is to be offered below \$1,000 and can do soft-soldering, tempering, annealing and hardening. It is 60x24x34

in. and operates on manufactured, natural or LP gas. Uses standard flux and perform solder forms. Accepts materials 0-10 in. wide, 0-30 in. high. *Youngberg Bros.*

For more data circle No. 29 on postcard, p. 81



Production shear does fast, heavy duty shearing

Said to be the only one of its type, a new 24 in. production shear is built for fast, heavy duty power shearing. It has a blade length of 24 in., a throat 7 1/2 in. deep and capacity up to 1/8 in. mild steel. It operates at speeds up to 120 strokes per minute and is remarkably compact: 72 in. high, 50 in. wide and

deep. It will do straight and angle shearing, sequence shearing, slitting, notching blanking and accurate duplication of straightside parts without dies. Important features: all adjustments in front, sit-stand operation, burr-free cutting. *Lodge & Shipley Co.*

For more data circle No. 30 on postcard, p. 81

NEW EQUIPMENT

Mechanized desk

This new drafting desk is said to operate on an entirely different principle from all other types of drafting desks and tables. Its platform is equipped with an endless plastic belt, to which drawings are affixed. Turning a hand wheel, the draftsman can revolve the belt in either direction, bringing any part of the drawing within easy



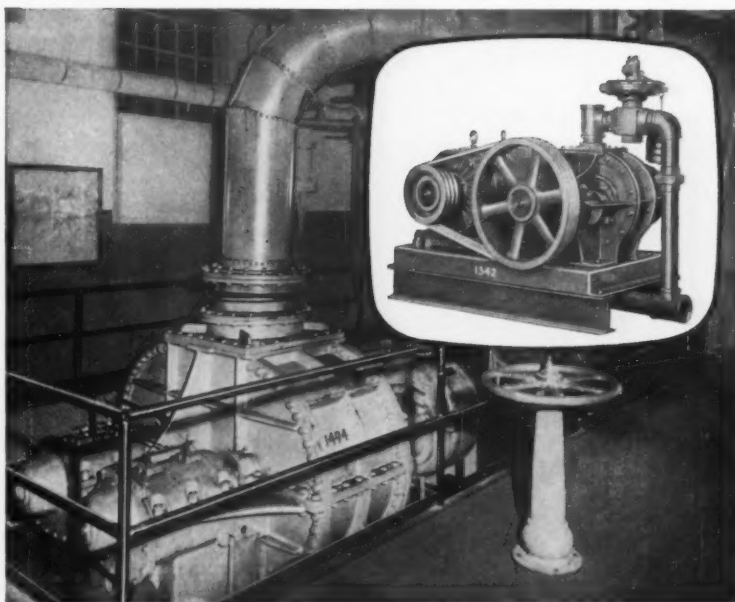
reach. With this drafting becomes a seated operation. Tiresome standing and stooping, and uncomfortable stools are eliminated. Draftsmen can be comfortably seated and enjoy the same comfort that office workers presumably have. It is made entirely of metal. Working surfaces are covered with desk top quality linoleum. *General Fireproofing Co.*

For more data circle No. 31 on postcard, p. 81

Semi-automatic tool

This high precision boring, turning and facing attachment converts any standard lathe into a high-speed, semi-automatic production tool. Essentially it is a tool holder mounted on long, hardened, precision-ground ways and equipped with both pneumatic and hydraulic action. Adjustable stops control length of cut and depth of bore. In operation, the tool carriage is rapidly moved into cutting position by an air cylinder. Tool carriage control is taken over by an hydraulic cylinder which advances the tool at the prescribed rate. This is adjustable. At completion tool is rapidly retracted to its "start" position by the air cylinder. *Exact level & Tool Mfg. Co.*

For more data circle No. 32 on postcard, p. 81



ALL SIZES OF R-C GAS PUMPS INCLUDE *plur-ability* VALUES

Positive control of volume and pressure, with the simple rotary impeller principle, stands out as one of the most valuable advantages of Roots-Connorsville Gas Pumps. They deliver this prime essential, whether at a trickle of 5 cfm or an outpouring of 50,000 cfm.

This same simplicity of design, with sturdy construction, means little wear-out, down-time or maintenance. These *plur-ability* values mean that your R-C Pumps will probably outlive the equipment they serve.

With 76 sizes and capacities, R-C Rotary Positive units can be closely matched to your work. Or, if your plans call for Centrifugal Pumps or Exhausters, Roots-Connorsville is the only builder offering you an unbiased *dual choice*.

Write for latest details and specifications in Bulletin 31-B-17 for small sizes and Bulletin 32-33-B-13 for larger units.

Ask about *plur-ability* in all R-C equipment

Centrifugal and Rotary Positive
Blowers, Gas Pumps and
Exhausters

Positive Displacement
Vacuum Pumps and Meters

Inert Gas Generators

Spiraxial® Compressors

Detailed bulletins available
on all R-C equipment.



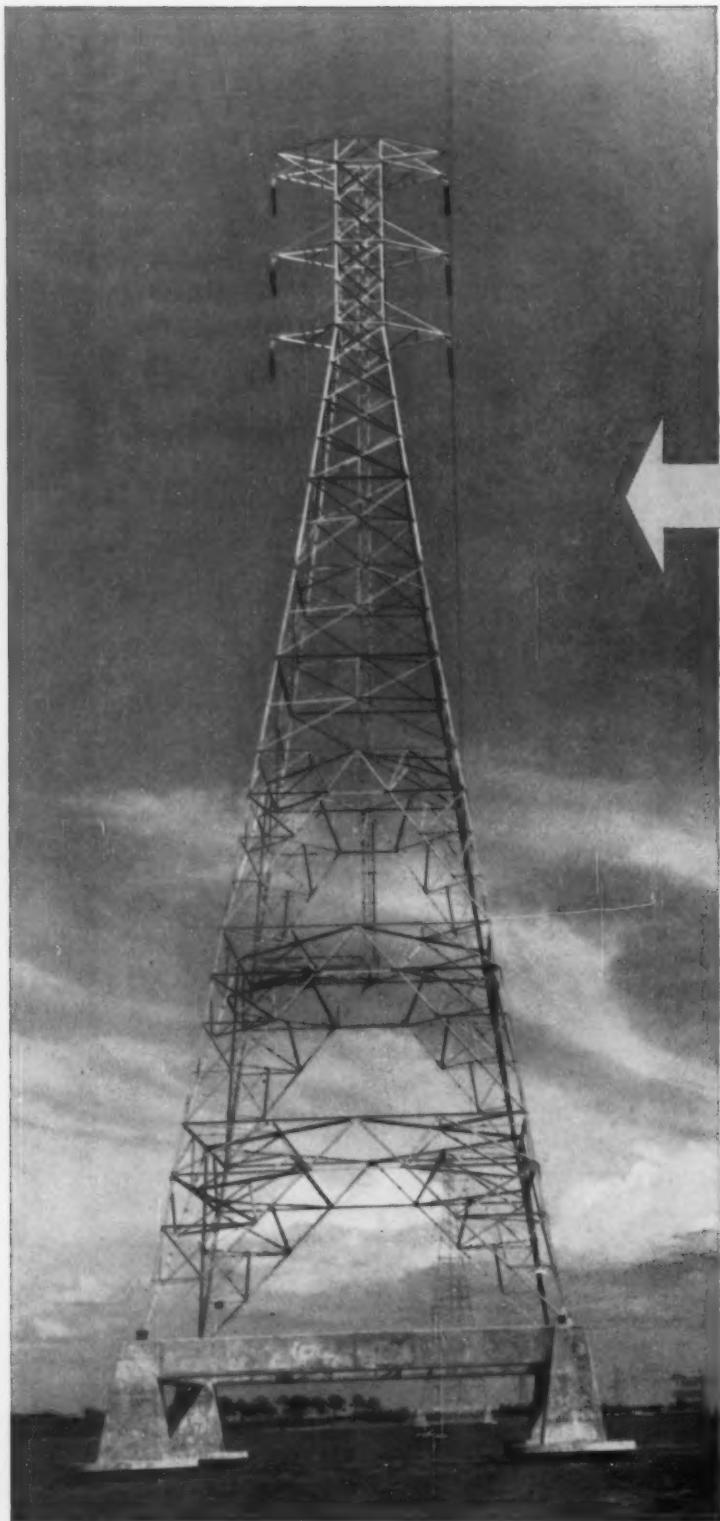
ROOTS-CONNERSVILLE BLOWER



A DIVISION OF DRESSER INDUSTRIES, INC.

556 Ohio Ave., Connorsville, Indiana. In Canada, 629 Adelaide St. W., Toronto, Ont.

You can make it better



ERECTION COSTS REDUCED \$7,200 by using USS MAN-TEN Steel rather than carbon steel in the legs of four 198 ft. transmission towers that carry power lines across Old Tampa Bay, Florida. Six tons of weight saved by MAN-TEN Steel in the East Bank tower saved \$1,200 in erection cost. The $6\frac{1}{2}$ tons saved in each of the three towers erected in the Bay saved \$6,000 more. The total of 26 tons of steel saved by using MAN-TEN Steel also reduced the cost of the material used in the towers, even though MAN-TEN Steel costs a little more per lb. (Towers designed and fabricated by American Bridge Division of United States Steel for Florida Power Corporation, St. Petersburg, Fla. Erected by Southeastern Utilities Service Co., Miami, Fla.)



THE SUPERIOR STAMINA and corrosion resistance of USS COR-TEN Steel save power by saving weight, insure minimum maintenance and longer service life in this full-length "dome" lounge car built for the Milwaukee Road by Pullman-Standard Car Manufacturing Company, Chicago, Ill. More than 6,000 modern passenger cars and 190,000 freight cars of all types have been built to date with USS COR-TEN Steel.

with USS High Strength Steels



USED IN THE LOADING BOOM and supporting "A" frame of this self-unloading cargo vessel which can discharge 4,500 tons of limestone per hour, USS TRI-TEN "E" Steel not only materially increases the strength and durability of the structure but saves more than 18,000 lbs. of weight. 50,000 lbs. of TRI-TEN "E" Steel in plate and structural form were used in this application. (Designed by Robins Engineers, Division of Hewitt-Robins, Incorporated, for Manitowoc Shipbuilding, Incorporated.)



WEIGHT WAS REDUCED 10% yet strength-to-weight ratio was increased over former construction by using USS MAN-TEN Steel in the arch boom, "A" frame and tongue of this heavy-duty logging unit. The increased strength provided by MAN-TEN Steel makes it possible to handle log loads of maximum size—the reduced weight ensures greater mobility and maneuverability. Result: more footage, handled faster. (Designed and built by Hyster Company, Portland, Ore.)

IN USS HIGH STRENGTH STEELS, design engineers have at their command three service-tested steels that will permit them to materially increase the efficiency and economy of machinery, equipment and structures at little or no increase in first cost . . . and frequently, at a saving.

All three of these famous "steels that do more" — USS COR-TEN, USS MAN-TEN and USS TRI-TEN — have a 50% higher yield point than ordinary carbon steel. All have better corrosion resistance and offer greater resistance to wear, fatigue and impact. Each, however, has specific superior properties that should be considered in determining its selection.

USS COR-TEN Steel, for example, is distinguished by its superior resistance to atmospheric corrosion—4 to 6 times that of carbon steel. USS MAN-TEN Steel is intended for weight reduction by means of greater strength in moderate forming applications, with enhanced resistance to abrasion and atmospheric corrosion. USS TRI-TEN Steel's outstanding characteristics are excellent weldability and resistance

to shock at low temperatures.

Used singly or in combination, these steels can advantageously replace carbon steel to increase the strength and durability of vital parts *without* increasing their weight. Or when the use of thinner sections is feasible they can (1) reduce equipment weight without reducing its strength, or (2) increase the size and capacity of equipment without increasing total weight or the power required to move it.

You will find our 174-page "Design Manual for High Strength Steels" extremely useful in applying the benefits of these steels to your product. Send for free copy—simply write on your company letterhead to United States Steel Corporation, Room 5367, 525 William Penn Place, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
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USS HIGH STRENGTH STEELS

USS MAN-TEN • USS COR-TEN • USS TRI-TEN

UNITED STATES STEEL



Special Reports

On Finishing Non-Ferrous Metals

NUMBER II—Paint Base, Corrosion-Resistant Finishing with Iridite

WHAT IS IRIDITE?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a good paint base and decorative finishes for non-ferrous metals. However, continued developments have been so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can obtain proper surface preparation for painting and increase product durability with a single multi-purpose chemical pretreatment. Report I on decorative, corrosion-resistant paints and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, it is an accepted fact that metal surfaces should be prepared before painting to make possible an efficient paint system. Naturally, this preparation should provide for good initial paint adhesion. Chemical treatments have proved extremely effective in this respect, particularly those of a neutral or preferably acid nature. Further, to be most efficient, chemical treatments should provide a non-porous barrier to maintain adhesion by sealing the metal from the paint and moisture. They should also provide a self-healing film which prevents lateral corrosion in the event that bare metal is exposed through scratching.

The Iridite chromate conversion coatings meet all these requirements. Iridite

is a chemical conversion treatment for surface preparation. It provides initial paint bonding by molecular adhesion. It is acid in nature and produces a film that is gel-like and non-porous in structure. Thus, the Iridite film effectively seals the metal from the paint and from moisture penetration. Because the film contains certain relatively soluble constituents, it will protect areas scratched through to bare metal and prevent lateral corrosion. This is accomplished by a gradual leaching of these constituents into the damaged area.

Further, because of its gel-like, non-crystalline nature, the Iridite film will not affect the appearance or texture of the paint film, nor will it dust or powder to mar the painted surface. Because the film is non-porous, paint coverage is increased, thus substantial savings in paint costs will be realized. In addition, treated parts may be stored for long periods of time prior to painting without the risk of entrapped moisture causing blistering when painting.

Iridite chromate conversion coatings are widely used with equal ease and success under both baked and air-dried paint systems. While the actual adherence properties of the Iridite film do not increase appreciably with its thickness, corrosion protection does. The protection of the Iridite film is proportionate to its thickness and should be taken into consideration when selecting the Iridite to meet your needs. However, it is sometimes necessary to sacrifice maximum corrosion protection for appearance when a finished

part is to be only partially painted. For example, it may be desirable to use a thin, clear, bright Iridite film if the unpainted areas must present a chrome-like appearance. A typical case is that of instrument housings on which the exterior is painted and the inside left unpainted.

On the other hand, if all surfaces of the product are to be painted and maximum corrosion protection is required, the heavier and most protective Iridite films should be used. For example, all surfaces of zinc die cast fruit juicers are finished with a highly protective Iridite film prior to painting to provide maximum resistance to the corrosive action of fruit juices.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. In addition to providing an excellent base for paint, the Iridite films also have high decorative value when used as final finishes in themselves.

These films can produce a wide variety of pleasing appearances including clear bright, iridescent yellow, bronze, olive drab and brown. In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to their functions as protective and decorative finishes, and as bases for organic finishes and bonding compounds, Iridites have low electrical resistance. Some can be soldered and welded. The film does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

The Iron Age SUMMARY...

Steel inventories approaching all-time high . . . But shortage of critical products offsets overall abundance . . . Third quarter letdown coming . . . Labor outlook.

Inventories High . . . Steel inventories in consumers' hands are expected to reach an all-time high by the end of the second quarter. But the situation is not as easy for all steel consumers as it looks on the surface.

Imbalance in critical products such as plates, structurals and oil country goods would put some consumers in a tight spot relatively soon should labor trouble close down the steel industry.

Some steel users are literally living hand-to-mouth while others are sitting pretty with better-than-normal stocks. Reason for this is the ready availability of some steel products, particularly cold-rolled sheets, and the scarcity of other products, whose production is limited by finishing facilities.

Another qualifying factor on steel inventories is that the nation's productive capacity has been expanding and stocks in terms of days' supply are lower than a similar inventory would have been several years ago.

Third Quarter Slump . . . Assuming that labor negotiations are settled peacefully, steel is heading into a seasonal slump that will push steel

production to a 1956 low point in the third quarter. But the decline will be due mostly to easier demand for flat-rolled products, summer vacations and heat problems, and repair shutdowns.

But there will be a comeback in the fourth quarter for the following reasons: (1) Present heavy inventories of automobiles will have been cleaned up and steel ordering for 1957 models will be underway; (2) the money and credit situation should be easier by September; (3) capital equipment spending is rising; and (4) psychology of elections and defense spending.

This is why steel producers are shying away from heavy commitments on foreign business despite the easier short-term outlook. They don't want to be in the position of having to short-change domestic customers.

Labor Problem . . . Meanwhile, the outlook for a peaceful settlement of steel labor's demands appears to hinge on whether the union is serious about some of its objectives, particularly premium pay for weekend work. Steel producers will put up a stiff fight on this one, and the odds favoring a work stoppage will lengthen should the union stick by its guns.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,375	2,375	2,388	2,340
Ingot Index				
(1947-1949=100)	147.8	147.8	148.7	145.5
Operating Rates				
Chicago	99.5	100.0	98.0	99.5
Pittsburgh	98.0	100.0	100.0	97.0
Philadelphia	100.0	100.0	104.5	98.0
Valley	99.0	99.0	99.0	98.0
West	102.0	100.0	106.0	103.0
Detroit	100.0	97.0	98.0	96.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	103.0	106.0*	101.5	104.0
Birmingham	23.5	23.5	23.5	96.0
S. Ohio River	91.0	92.0*	89.0	72.0
Wheeling	103.0	105.0*	106.0	97.0
St. Louis	79.0	99.0	94.0	106.0
Northeast	90.0	93.0	90.0	90.0
Aggregate	96.5	96.5	97.0	97.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.179	5.179	5.179	4.797
Pig Iron (Gross Ton)	\$60.29	\$60.29	\$60.29	\$56.59
Scrap, No. 1 hvy (gross ton)	\$47.50	\$49.67	\$55.50	\$34.00
Nonferrous				
Aluminum ingot	25.90	25.90	25.90	23.20
Copper, electrolytic	46.00	46.00	46.00	36.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	34.50	34.50	34.50	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	96.25	96.875	98.375	91.625
Zinc, E. St. Louis	13.50	13.50	13.50	12.00

Plate Tight In Split Market

Loosening of other products offers slight help but construction and oil country goods will continue to feel pinch . . . USS adjusts prices on stainless grades.

♦ **GENERAL** easing of the market won't help users of those products that continue extremely tight. This applies specifically to plate, oil country goods, and heavy shapes and structurals.

There is some talk of easing of the plate market this summer, but it is apt to be negligible. Some rolling capacity until now used on sheets may be used to roll light gage plates. However, this is not of great significance in the overall market. Furthermore, at least one producer says it won't commit any rolling capacity to plate until after the steel labor negotiations are completed.

Theory is that if there is a strike of any duration, sheets will emerge as tight as they were a few months ago and returning capacity to sheets would again be in line.

There is no reprieve at all in sight for oil country goods users. Easing of other products is no help here and no letup in drilling programs is in sight. Mills are booked for the foreseeable future. Where drilling programs are curtailed, it is because of lack of availability of casing, tubing or line pipe.

While the market is easing in most other products, spot shortages still occur. Carbon bars are tight in some industries, but there may be some relief now that the auto industry has filled up its inventory and may let some of its tonnage go to other customers.

In prices, U. S. Steel Corp. raised prices of several grades of stainless from 1.5¢ to 2¢ per lb. The grades do not cover a significant portion of stainless dollar volume, generally are engineering grades.

SHEET AND STRIP . . . Activity in Pittsburgh still slow because of automotive slump, but all local offices handling other accounts report increasing orders. Some mill operators are figuring on a possible drop of 10 pct on steel orders unless a strike upsets inventories. Strip sales in Chicago beginning to cut back, again largely due to automotive. Hot-rolled sheet is holding up well at mill level but customers cagey about commitments beyond July. Cold-rolled sheet inventories are very high with some now beyond the 60-day mark, but customers not canceling any tonnages thus far at local mills, maintaining position on mill order books through July. Detroit still reports only a trickle of market activity. In Cleveland, mills are doing a hard selling job on hot-rolled sheet for July but finding fewer takers. Dropoff in hot-rolled hasn't been as steep.

BARS . . . Hot-rolled bar still in demand at the mill level in Chicago, though cold-finished delivery has begun to ease and backlogs at the finisher level are now sinking quite rapidly. Some cold-finished bar is again available on as little as two-week delivery, but situation is very spotty. Cold finishers seem fairly confident of a strong May and possibly June, but beyond that are beginning to talk about a sharp slump all the way through to September. Hot-rolled carryover at mills ran to four weeks but has been whittled down to virtually normal delivery in some cases.

Purchasing Agent's Checklist

STEEL: What's the top level outlook?	p. 23
INVENTORIES: Stories of big inventories are misleading	p. 24
MARKETING: Coke chemicals sales grow	p. 28

PLATE AND STRUCTURALS . . . In Chicago, plate continues very tight with some indication that 4-6 week carryover may be lengthening. Everybody on quotas for third and generally agreed now that third quarter quotas are below second quarter levels. Numerous plate fabricating jobs held up here and further south, running more than three weeks behind schedule due to wide plate shortage. Some mills say they can get November structural on new orders.

Some mills appear to have overbooked on structurals for third quarter. Fabricators are also guilty of overbooking. Hope is now that billets will come in easier supply as pressure for ingot slab rolling for sheets has fallen off. But so far, no relief.

A leading Cleveland sheet producer which leans heavily on auto output is seeking light-gage plate orders for third quarter to take up slack in cold-rolled sheets. Limiting factor on plate production is that only gages which can be coiled will be produced because of insufficient shearing facilities. Sizes to be turned out are 90 in. wide up to ¼-in. thick and 72-in. wide to 5/16-in. thick. Most promising market for these at present is tank, pressure vessels and similar operations.

WAREHOUSES . . . In Pittsburgh, one warehouse reports little easing in either demand or supply of steel products. Hot-rolled bars are more plentiful, but there is still a problem of getting large diameter and special quality bars. Galvanized sheets are easier to get. One source said demand for flat-rolled products was way off. Another warehouseman said hot-rolled sheets were as tight now as they had been all year. Plate and structurals are as tight as ever. Prices of alloy bars have been increased 5¢ to 50¢ per cwt to reflect new mill extras.

STAINLESS . . . U. S. Steel increased prices, May 19, on stainless types 303Se, 304L, 308, 309, 309S, 314, 316, 317, 321, 347, 348 and 416Se. Increases ran from 1½¢ to 2¢ a pound on the average. At the same time, USS changed the heat treating, plate billing weight and sheet packaging extras on stainless products at Pittsburgh.

Changes include setting up a separate table of computed billing weights for sheets wider than 80 in., and the placing of sheet packaging extras on a graduated scale, based on total, rather than flat rate basis.

Comparison of Prices

(Effective May 29, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	May 29 1956	May 22 1956	May 1 1956	May 1 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.28	6.28	6.28	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	41.50

Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$9.85	\$9.45*	\$9.45*	\$9.05
Tinplate, electro (0.50 lb.)	8.55	8.15*	8.15*	7.75
Special coated mfg. ternes	9.10	8.70*	8.70*	7.85

Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.80
Wrought iron bars	11.50	11.50	11.50	10.40

Wire: (per pound)				
Bright wire	6.60¢	6.60¢	6.60¢	5.75¢

Rails: (per 100 lb.)				
Heavy rails	\$4.725	\$4.725	\$4.725	\$4.45
Light rails	5.65	5.65	5.65	5.35

Semifinish Steel: (per net ton)				
Rerolling billets	\$68.50	\$68.50	\$68.50	\$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00

Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90

Finished Steel Composite: (per pound)				
Base price	5.179¢	5.179¢	5.179¢	4.797¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

← To identify producers, see Key on P. 104 →

Producing Point	Basic	Fdry.	Mall.	Beas.	Low Phos.
Bethlehem B3	62.00	62.50	63.00	63.50	
Birdsboro, Pa. B6	62.00	62.50	63.00	63.50	
Birmingham R3	54.50	55.00*			
Birmingham W9	54.50	55.00*	59.00		
Birmingham U4	54.50	55.00*	59.00		
Buffalo R3	60.00	60.50	61.00	61.50	
Buffalo H3	60.00	60.50	61.00		
Buffalo W6	60.00	60.50	61.00		
Chester C17	62.00	62.50	63.00		
Chicago I4	60.00	60.50	60.50	61.00	
Cleveland A5	60.00	60.50	60.50	61.00	65.00†
Cleveland R3	60.00	60.50	60.50	61.00	
Duluth I4	60.00	60.50	60.50	61.00	65.00
Erie I4	60.00	60.50	60.50	61.00	65.00
Everett M6	62.00	62.50	63.00		
Fentons K1	67.50	68.00			
Geneva, Utah C7	60.00	60.50			
Granite City G2	61.90	62.40	62.90		
Hubbard Y1			60.50		
Leno Star L3		55.80			
Midland C11	60.00				
Minnesota C5	62.00	62.50	63.00		
Monessen P6	60.00				
Neville Is. P4	60.00	60.50	60.50	61.00	65.00†
N. Tonawanda T1	60.00	60.50	61.00	61.50	
Pittsburgh U1	60.00		60.50	61.00	
Sharpville S3	60.00	60.50	60.50	61.00	
Se. Chicago R3	60.00				
Steelton B3	62.00	62.50	63.00	63.50	68.00
Swedeland A2	62.00	62.50	63.00	63.50	
Toledo I4	60.00	60.50	60.50	61.00	
Troy, N. Y. R3	62.00	62.50	63.00	63.50	68.00
Youngstown Y1			60.50	61.00	

DIFFERENTIALS: Add .50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional, 0.25 pct nickel. * Add \$1.00 for 0.31-0.69 pct phos.† Intermediate low phos. Silvery Iron Buffalo, H1, \$68.75; Jackson, J1, G1, \$67.50. Add \$1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferroalloy prices are \$1 over comparable silvery iron.

Product	201	202	301	302	303	304	316	321	348	410	416	430
Ingot, reroll.	18.50	19.75	19.25	20.50	—	21.75	33.00	26.50	35.25	15.00	—	15.25
Slabs, billets, reroll.	23.00	25.50	23.75	26.25	26.75	27.50	41.75	33.50	44.50	19.50	—	19.75
Forg. dca., die blks., rgs.	—	—	—	—	—	—	—	—	—	—	—	—
Billets, forging	—	31.00	31.75	32.00	34.75	33.75	52.75	39.75	52.50	25.50	26.00	26.00
Bars, struct.	—	36.75	38.00	38.25	41.00	40.25	62.75	47.25	62.00	30.50	31.00	31.00
Plates	—	38.75	40.00	40.25	42.75	43.00	66.00	51.25	66.75	31.75	33.00	32.25
Sheets	42.25	42.50	44.25	44.50	52.25	47.25	70.25	56.25	75.50	36.25	—	36.75
Strip, hot-rolled	31.00	33.50	32.00	34.50	—	37.25	59.75	45.75	61.25	28.00	—	28.75
Strip, cold-rolled	39.00	42.50	41.00	44.50	—	47.25	70.25	56.25	75.50	36.25	—	36.75
Wire CF, HR; Rod HR	—	—	36.00	36.25	39.00	38.25	59.75	45.00	59.00	29.00	29.50	29.50

STAINLESS STEEL PRODUCING POINTS:

Slabs: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, (2.25¢ lower on Type 430) J2; Baltimore, Md., Middletown, O., A7; Massillon, O., R3; Gary, Ind., U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, Ind., Philadelphia, D5.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Lechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, Mich., C2; Canton, Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, O., Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (2.5¢ per lb higher); W1 (2.5¢ per lb higher); New Bedford, Mass., R6.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1; F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, Ill., U1; Syracuse, N. Y., C11; Watervliet, N. Y., A5; Waukegan, Ill., Canton, O., T3; Ft. Wayne, Ind., Philadelphia, D5; Detroit, R5.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, Ind., J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, Pa., U1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicago, Ill., U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Philadelphia, D5.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forgings billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, Ill., U1; Syracuse, C11; Detroit, R5.

Market Continues Decline

Absence of significant mill buying sends prices down in most market areas . . . Chicago has strongest market and holds nearly firm . . . Steel labor a factor.

◆ DEALERS and consumers are playing a game of hide-and-seek, with the consumers doing the hiding.

As a result, prices in most areas dropped, in many markets on the basis of appraisal in the absence of significant buying. Mills apparently are determined to stay out of the market to some extent until the steel labor situation crystallizes—or until prices drop to much lower levels.

Chicago was the last major market to fall into line, the break coming this week on the basis of broker activity and small purchases by the mills. Prices of steelmaking grades there declined \$1 to \$2. Last week, Chicago market looked steady.

This fencing between dealer and consumer is traditional before labor negotiations. But unless the strength apparent in the Midwest spreads to other market areas, further drops may be in the wind.

On the basis of declines in the major consuming areas of Chicago, Philadelphia, and Pittsburgh, THE IRON AGE Composite dropped to \$47.50.

Pittsburgh . . . Market seems to be getting progressively weaker as strike talk becomes louder. Only the cast grades are holding firm. On a purchase by an area mill the price of No. 1 hvy. melting dropped \$3. A small mill paid more than the going price for No. 2 bundles, but another consumer bought freely at \$38 and less. Turnings are off \$1 in sympathy with the drop in open hearth prices. Low phos is down \$3 and railroad grades are off \$1 to \$3 as brokers report losing money on scrap bought this month.

Chicago . . . Following price breaks in the East, broker buying prices and

small purchases by mills dropped \$1 to \$2 in the Chicago area. The break developed in a market that until the end of last week had been regarded as quite stable. With scrap in low quantity in the area, it is quite probable that attempts to purchase tonnages at the new prices will meet with very strong resistance. Previously, a few prices had gone above the top of THE IRON AGE spread in scattered grades though tonnages were not large, indicating the probability of further advances at a later date. Punchings and plate, for instance, on a new purchase, moved at \$57 in the area. Similarly, cast grades in small quantities were moving at above the general market price.

Philadelphia . . . Market here is at an almost complete standstill. For the third successive week there have been no sales. Word is around that Fairless will be coming into the market within a matter of days. Smaller mills in the area seem to be holding back until Fairless establishes a new price. Dealers concede that they would be willing to sell at a lower price than previously quoted.

New York . . . Unsettled market due to lack of new steelmaking orders. However, brokers insist their next buys will be 50 cents to \$1 below last week's prices. This would make price of No. 1 hvy. melting \$43 to \$44 in this district. Turnings and cast grades continue to hold up at going rates.

Detroit . . . All scrap grades dropped \$5 this week as bidding on the automotive lists reflected the overall weakness of the market. List prices were off \$7 to \$8 from last month's figures. Cause of the softening described as uncertainty about a steel strike, plus the fact that warm weather will curtail mill operations to some degree.

Cleveland . . . Prices here dropped \$2.50 and in the Valley they slipped \$3. Major percentage of first lot of

Cleveland automotive bundles went to one broker for slightly under \$48. Tonnage for next month was estimated at 10,000 although operations at the present indicate a lower figure. The price was about \$10 under average of a month ago. In the Valley, steelmakers are being offered substantial tonnage of No. 1 grades at \$50 and these may materialize into sales. Dealers yards are pretty well cleaned out because of heavy shipments on old orders and low collections following price drop.

Birmingham . . . "Very quiet," was the description in this market for all grades for both domestic use and export. Electric furnace grades were active but showed a gradual decline. Cast market was the only area which continued to hold firm.

St. Louis . . . In an absence of strong mill activity, at least two purchases, apparently not in heavy quantity, moved No. 2 steel making grades down \$1, but the market generally remained stable and lower offering prices have attracted no large tonnages of material. Some leveling in the market appears general.

Cincinnati . . . Long term price output is not bleak because fringe consumer has no strike history. Foundry business continues slow; especially automotive. Dealers yards are fairly well cleaned out because of heavy shipments on old orders. Local mill placed a small order with local dealers for \$3.50 under previous market on No. 1 and No. 2 hvy. melting, No. 2 bundles, and small tonnage of turnings, thereby dropping price by that margin.

Buffalo . . . Market showed signs of weakening with an absence of new buying. Steel strike talk was having a depressing effect with dealer inventories lower than they have been for many years. Prices for No. 1 hvy. melting and No. 2 hvy. melting, No. 1 and No. 2 bundles and No. 1 busheling were all off between \$2 and \$3 per ton.

Boston . . . Prices dropped \$1 on steelmaking grades because of inactivity here and lower prices in neighboring consuming areas. Export continued at a low level.

West Coast . . . Markets in Los Angeles and San Francisco were somewhat softer than last week. Exporters were fairly active, but mills seemed to be getting all they needed. Prices at Seattle remained unchanged.



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139H56

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN

Scrap Prices

(Effective May 29, 1956)

Pittsburgh

No. 1 hvy. melting.....	\$45.00 to \$46.00
No. 2 hvy. melting.....	41.50 to 42.50
No. 1 bundles.....	45.00 to 46.00
No. 2 bundles.....	37.00 to 38.00
Machine shop turn.....	33.00 to 34.00
Mixed bor. and ms. turn.....	33.00 to 34.00
Shoveling turnings.....	37.00 to 38.00
Cast iron borings.....	37.00 to 38.00
Low phos. punch'g plate.....	55.00 to 56.00
Heavy turnings.....	44.00 to 45.00
No. 1 RR. hvy. melting.....	57.00 to 58.00
Scrap rails, random lgth.....	64.00 to 65.00
Rails 2 ft and under.....	68.00 to 69.00
RR. steel wheels.....	62.00 to 63.00
RR. spring steel.....	62.00 to 63.00
RR. couplers and knuckles.....	62.00 to 63.00
No. 1 machinery cast.....	56.00 to 57.00
Cupola cast.....	50.00 to 51.00
Heavy breakable cast.....	48.00 to 49.00

Chicago

No. 1 hvy. melting.....	\$47.00 to \$48.00
No. 2 hvy. melting.....	37.00 to 38.00
No. 1 factory bundles.....	32.00 to 33.00
No. 1 dealers' bundles.....	47.00 to 48.00
No. 2 dealers' bundles.....	35.00 to 36.00
Machine shop turn.....	26.00 to 27.00
Mixed bor. and turn.....	28.00 to 29.00
Shoveling turnings.....	28.00 to 29.00
Cast iron borings.....	28.00 to 29.00
Low phos. forge crops.....	58.00 to 59.00
Low phos. punch'g plate.....	64.00 to 65.00
Low phos. 3 ft and under.....	53.00 to 54.00
No. 1 RR. hvy. melting.....	54.00 to 55.00
Scrap rails, random lgth.....	64.00 to 65.00
Rerolling rails.....	71.00 to 72.00
Rails 2 ft and under.....	70.00 to 71.00
Locomotive tires, cut.....	59.00 to 60.00
Cut bolsters & side frames.....	58.00 to 59.00
Angles and splice bars.....	65.00 to 66.00
RR. steel car axles.....	70.00 to 71.00
RR. couplers and knuckles.....	58.00 to 59.00
No. 1 machine cast.....	51.00 to 52.00
Cupola cast.....	47.00 to 48.00
Heavy breakable cast.....	41.00 to 42.00
Cast iron brake shoe.....	40.00 to 41.00
Cast iron wheel.....	52.00 to 53.00
Malleable.....	61.00 to 62.00
Stove plate.....	41.00 to 42.00
Steel car wheels.....	57.00 to 58.00

Philadelphia Area

No. 1 hvy. melting.....	\$49.00 to \$50.00
No. 2 hvy. melting.....	41.00 to 42.00
No. 1 bundles.....	49.00 to 50.00
No. 2 bundles.....	38.00 to 39.00
Machine shop turn.....	32.00 to 33.00
Mixed bor. and short turn.....	35.00 to 36.00
Cast iron borings.....	28.00 to 29.00
Shoveling turnings.....	27.00 to 28.00
Clean cast chem. borings.....	43.00 to 44.00
Low phos. 5 ft and under.....	54.00 to 55.00
Low phos. 2 ft and under.....	55.00 to 56.00
Low phos. punch'g.....	55.00 to 56.00
Elec. furnace bundles.....	53.00 to 54.00
Heavy turnings.....	45.00 to 46.00
RR. steel wheels.....	59.00 to 60.00
RR. spring steel.....	59.00 to 60.00
Rails 18 in. and under.....	64.00 to 65.00
Cupola cast.....	48.00 to 49.00
Heavy breakable cast.....	52.00 to 53.00
Cast iron car wheels.....	57.00 to 58.00
Malleable.....	68.00 to 69.00
Unstripped motor blocks.....	37.00 to 38.00
No. 1 machinery cast.....	54.00 to 55.00

Cleveland

No. 1 hvy. melting.....	\$47.50 to \$48.50
No. 2 hvy. melting.....	37.00 to 38.00
No. 1 bundles.....	47.50 to 48.50
No. 2 bundles.....	33.00 to 34.00
No. 1 busheling.....	47.50 to 48.50
Machine shop turn.....	30.00 to 31.00
Mixed bor. and turn.....	31.00 to 32.00
Shoveling turnings.....	31.00 to 32.00
Cast iron borings.....	31.00 to 32.00
Cut struct'l & plates, 2 ft & under.....	53.00 to 54.00
Drop forge flashings.....	47.50 to 48.50
Low phos. punch'g. plate.....	48.50 to 49.50
Foundry steel, 2 ft & under.....	50.00 to 51.00
No. 1 RR. heavy melting.....	53.00 to 54.00
Rails 2 ft and under.....	68.00 to 69.00
Rails 18 in. and under.....	69.00 to 70.00
Railroad grate bars.....	39.00 to 40.00
Steel axle turnings.....	37.00 to 38.00
Railroad cast.....	54.00 to 55.00
No. 1 machinery cast.....	54.00 to 55.00
Stove plate.....	51.00 to 52.00
Malleable.....	59.00 to 60.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting.....	\$50.00 to \$51.00
No. 2 hvy. melting.....	38.00 to 39.00
No. 1 bundles.....	50.00 to 51.00
No. 2 bundles.....	36.00 to 37.00
Machine shop turn.....	30.00 to 31.00
Shoveling turnings.....	35.00 to 36.00
Cast iron borings.....	35.00 to 36.00
Low phos. plate.....	51.00 to 52.00

Buffalo

No. 1 hvy. melting.....	\$49.00 to \$50.00
No. 2 hvy. melting.....	39.00 to 40.00
No. 1 busheling.....	49.00 to 50.00
No. 1 bundles.....	49.00 to 50.00
No. 2 bundles.....	36.00 to 37.00
Machine shop turn.....	29.00 to 30.00
Mixed bor. and turn.....	30.00 to 31.00
Shoveling turnings.....	31.00 to 32.00
Cast iron borings.....	31.00 to 32.00
Low phos. plate.....	57.00 to 58.00
Scrap rails, random lgth.....	60.00 to 61.00
Rails 2 ft and under.....	70.00 to 71.00
RR. steel wheels.....	60.00 to 61.00
RR. spring steel.....	60.00 to 61.00
RR. couplers and knuckles.....	60.00 to 61.00
No. 1 machinery cast.....	53.00 to 54.00
No. 1 cupola cast.....	50.00 to 51.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting.....	\$41.00 to \$42.00
No. 2 hvy. melting.....	31.00 to 32.00
No. 1 bundles, openhearth.....	41.00 to 42.00
No. 2 bundles.....	28.00 to 29.00
New busheling.....	41.00 to 42.00
Drop forge flashings.....	40.50 to 41.50
Machine shop turn.....	21.00 to 22.00
Mixed bor. and turn.....	24.00 to 25.00
Shoveling turnings.....	29.00 to 30.00
Cast iron borings.....	29.00 to 30.00
Low phos. punch'g. plate.....	41.00 to 42.00
No. 1 cupola cast.....	46.00 to 47.00
Heavy breakable cast.....	34.00 to 35.00
Stove plate.....	35.00 to 36.00
Automotive cast.....	44.00 to 45.00

St. Louis

No. 1 hvy. melting.....	\$40.00 to \$41.00
No. 2 hvy. melting.....	36.00 to 37.00
No. 1 bundles.....	33.50 to 34.50
No. 2 bundles.....	32.00 to 33.00
Machine shop turn.....	26.00 to 27.00
Cast iron borings.....	28.00 to 29.00
Shoveling turnings.....	28.00 to 29.00
No. 1 RR. hvy. melting.....	51.50 to 52.50
Rails, random lengths.....	57.00 to 58.00
Rails 18 in. and under.....	65.00 to 66.00
Locomotive tires uncut.....	53.00 to 54.00
Angles and splice bars.....	53.00 to 54.00
Std. steel car axles.....	56.00 to 57.00
RR. specialties.....	55.00 to 56.00
Cupola cast.....	47.00 to 48.00
Heavy breakable cast.....	35.00 to 36.00
Cast iron brake shoes.....	42.00 to 43.00
Stove plate.....	40.00 to 41.00
Cast iron car wheels.....	53.50 to 54.50
Rerolling rails.....	68.00 to 69.00
Malleable.....	58.00 to 59.00
Unstripped motor blocks.....	32.00 to 33.00

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting.....	\$37.00 to \$38.00
No. 2 hvy. melting.....	21.00 to 22.00
No. 1 bundles.....	37.00 to 38.00
No. 2 bundles.....	27.50 to 28.00
No. 1 busheling.....	37.00 to 38.00
Elec. furnace, 3 ft & under.....	39.00 to 40.00
Machine shop turn.....	24.00 to 24.50
Mixed bor. and short turn.....	27.00 to 27.50
Shoveling turnings.....	27.50 to 28.00
Clean cast chem. borings.....	30.00 to 31.00
No. 1 machinery cast.....	44.50 to 45.00
Mixed cupola cast.....	40.00 to 41.00
Heavy breakable cast.....	41.50 to 42.00
Stove plate.....	39.00 to 40.00
Unstripped motor blocks.....	25.50 to 26.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting.....	\$45.00 to \$46.00
No. 2 hvy. melting.....	31.00 to 32.00
No. 2 bundles.....	32.00 to 33.00
Machine shop turn.....	25.00 to 26.00
Mixed bor. and turn.....	25.00 to 26.00
Shoveling turnings.....	29.00 to 30.00
Cast iron borings.....	31.00 to 32.00
Clean cast chem. borings.....	49.00 to 50.00
No. 1 machinery cast.....	49.00 to 47.00
Mixed yard cast.....	46.00 to 47.00
Charging box cast.....	46.00 to 47.00
Heavy breakable cast.....	46.00 to 47.00
Unstripped motor blocks.....	33.00 to 34.00

Birmingham

No. 1 hvy. melting.....	\$36.00 to \$37.00
No. 2 hvy. melting.....	34.00 to 35.00
No. 1 bundles.....	36.00 to 37.00
No. 2 bundles.....	25.00 to 26.00
No. 1 busheling.....	36.00 to 37.00
Machine Shop turn.....	27.00 to 28.00
Shoveling turnings.....	29.00 to 30.00
Cast iron borings.....	41.50 to 42.50
Electric furnace bundles.....	44.00 to 45.00
Bar crops and plates.....	52.00 to 53.00
Structural and plate, 2 ft.....	51.00 to 52.00
No. 1 RR. hvy. melting.....	47.00 to 48.00
Scrap rails, random lgth.....	58.00 to 59.00
Rails, 18 in. and under.....	62.00 to 63.00
Angles & splice bars.....	57.00 to 58.00
Rerolling rails.....	65.00 to 66.00
No. 1 cupola cast.....	48.50 to 49.50
Stove plate.....	47.00 to 48.00
Charging box cast.....	32.00 to 33.00
Cast iron car wheels.....	39.00 to 40.00
Unstripped motor blocks.....	37.50 to 38.50
Mashed tin cans.....	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting.....	\$46.00 to \$47.00
No. 2 hvy. melting.....	36.00 to 37.00
No. 1 bundles.....	46.00 to 47.00
No. 2 bundles.....	34.00 to 35.00
Machine shop turn.....	26.00 to 27.00
Mixed bor. and turn.....	27.00 to 28.00
Shoveling turnings.....	28.00 to 29.00
Cast iron borings.....	27.00 to 28.00
Low phos. 18 in. & under.....	53.00 to 54.00
Rails, 18 in. and under.....	59.00 to 60.00
No. 1 cupola cast.....	42.00 to 43.00
Hvy. breakable cast.....	44.00 to 45.00
Drop broken cast.....	53.00 to 54.00

San Francisco

No. 1 hvy. melting.....	\$42.00 to \$43.00
No. 2 hvy. melting.....	39.00 to 40.00
No. 1 bundles.....	41.00 to 42.00
No. 2 bundles.....	34.00 to 35.00
No. 3 bundles.....	28.00 to 29.00
Machine shop turn.....	23.00 to 24.00
Cast iron borings.....	24.00 to 25.00
No. 1 RR. hvy. melting.....	42.00 to 43.00
No. 1 cupola cast.....	48.00

Los Angeles

No. 1 hvy. melting.....	\$42.00 to \$44.00
No. 2 hvy. melting.....	38.00 to 40.00
No. 1 bundles.....	41.00 to 43.00
No. 2 bundles.....	31.00 to 33.00
No. 3 bundles.....	27.00 to 29.00
Machine shop turn.....	22.00 to 24.00
Shoveling turnings.....	22.00 to 24.00
Cast iron borings.....	22.00 to 24.00
Elec. furn. 1 ft and under.....	42.00 to 44.00
No. 1 RR. hvy. melting.....	42.00 to 44.00
No. 1 cupola cast.....	46.00

Seattle

No. 1 hvy. melting.....	\$46.00
No. 2 hvy. melting.....	42.00
No. 2 bundles.....	33.00
No. 3 bundles.....	31.00
No. 1 cupola cast.....	45.00
Mixed yard cast.....	45.00

Hamilton, Ont.

No. 1 hvy. melting.....	\$50.50
No. 2 hvy. melting.....	46.50
No. 1 bundles.....	50.50
No. 2 bundles.....	42.00
Mixed steel scrap.....	44.50
Bushellings.....	40.50
Bush., new fact., prep'd.....	48.50
Bush., new fact., unprep'd.....	44.50
Machine shop turn.....	23.00
Short steel turn.....	27.50
Mixed bor. and turn.....	24.00
Rails, rerolling.....	58.50
Cast scrap.....	50.00

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May 31, 1956

Barter Food For Lead, Zinc?

Dept. of Agriculture may get authority to barter surplus food for foreign lead and zinc . . . ODM considering plan but no immediate action expected . . . Producers puzzled.

♦ FOR THE LAST month or so, zinc and lead markets in the U. S. have been relatively stable, with never too much deviation in any direction. Prices are firm and the market is generally considered relaxed and rather colorless.

But the latest government plan is certain to pull the industry out of any doldrums and give it something to puzzle over.

Office of Defense Mobilization is seriously considering granting authority to the Commodity Stabilization Service of the Dept. of Agriculture to barter surplus food for foreign lead and zinc.

Basically, the system would empower CSS to take excess produce out of the country, having the effect of putting a few struts under farm prices; and returning with stocks of foreign metal to be deposited in a supplemental stockpile.

Supplemental stockpile metal will eventually find its way into either short term or long range stockpile.

Advantages from the standpoint of the farmer, the government and possibly the defense contractor are obvious. But the domestic producer is not sure exactly what effect it will have on him.

Although no concrete action has as yet been taken, the government is assuring producers that the change in the market caused by the barter would be to their advantage.

Opinion is that it would buoy up European markets, which have lately showed definite signs of weakness, and that strength would be reflected in a healthy, more active domestic situation. Minority even insist that barter plan would keep foreign metal off U. S. markets and help hold the price line. Exactly how this would be accomplished has not as yet been explained.

Thus far producers are taking a "maybe so, but on the other hand"—attitude, considering the fact that a shortage in Europe, caused by over-bartering, might well push prices up here as well as there. With markets currently more comfortable and consumer inventories improved, producers are not sure but that consumers might try to live off these inventories, for awhile at least, were prices to go any higher.

Also, stockpiling foreign metal might reduce the government call for domestic metal, not critical now, but mighty handy to have when supply exceeds demand by much.

Consumers are not sure either. Expiration of government's call for domestic lead and zinc would put more metal within reach of industry. But if the government continues to buy, on top of the foreign metal they have taken off the market, it could elevate demand high over supply.

COPPER . . . It depends on where you stand as to whether recent developments are good or bad. The one sure thing is that in today's market almost no one is on the fence.

Price on the London Metals Exchange took another nosedive. Current price is about 7¢ below domestic producers price—between 38¢ and 39¢ per lb. General opinion had been that the downtrend would ease off and the LME would recover to a point somewhat below its previous position, about the same as 46¢ domestic price. However, this has not occurred. There is even a slight tinge of panic in some quarters. Feeling is that if price doesn't recover or at least hit a plateau almost immediately, the situation could qualify as a price collapse.

Consumers are generally happy—looking forward to a downward adjustment in domestic price. Custom smelters are down to 43¢, may be headed lower.

Producers are not unhappy—but they realize that a price cut is expected of them. Labor negotiations are about to begin. At the very best it will cost them between 10¢ and 20¢ per hour per man, and it might even mean a costly strike. Despite a price collapse in London, they might not be able to afford to fall into line. And of course Chile will not be eager to see her main export sell for a lower price.

MAGNESIUM . . . The industry seems to be rolling along in high gear. Latest information from the Magnesium Assn. indicates 6081 short tons of metal were produced in April 1956. Although this is down about 4 pct from the previous month, the industry can still be considered to be operating at capacity.

Shipments of wrought products, including extrusions, forgings, sheet and strip were also off slightly, 1140 short tons as compared to the 1176 shipped in March.

Cast shipments were up almost unanimously. Total of 4493 short tons shipped during the first quarter 1956 were up 27 pct over the like period in 1955. Increase was not due to any one big month, but rather to capacity operations and a slight but definite increase month by month. 1523 tons shipped in March were 1 pct higher than the previous month. All classifications, with the exception of anodes, were up over previous month.

TITANIUM . . . Reynolds Metals Co. has delivered its first commercial order of titanium extrusions to a jet engine manufacturer.

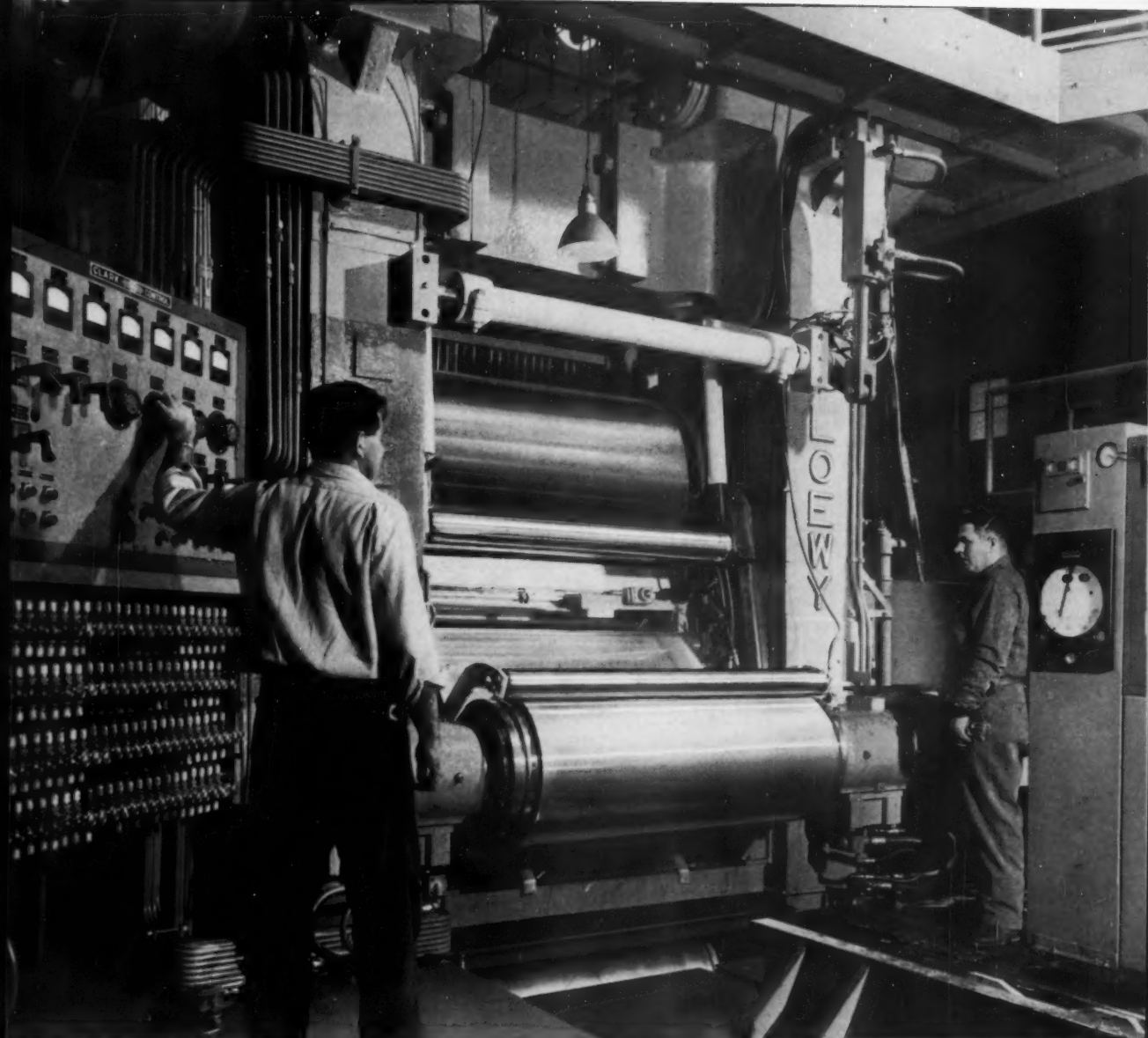
Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	May 23	May 24	May 25	May 26	May 28	May 29
Copper, electro, Conn.	46.00	46.00	46.00	46.00	46.00	46.00
Copper, Lake, delivered	46.00	46.00	46.00	46.00	46.00	46.00
Tin, Straits, New York	97.25	96.625	96.375	....	96.375	96.25*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.

*Tentative



Loewy-Hydropress foil mill reduces aluminum from .026" to .00025" at speeds up to 3000 fpm

At Kaiser Aluminum and Chemical Corporation's Permanente plant, this Loewy four-high 60-inch mill is producing foil up to 54 inches wide. This is the widest aluminum foil made in the west.

The Loewy mill reduces aluminum from .026" to .00025" in thickness, at speeds up to 3,000 fpm. Its installation increased plant rated capacity 50%—from 12 million to 18 million pounds per year.

Loewy can furnish you with high speed foil mills up to 72" or wider, to meet your requirements. In addition, we design, build and install blooming mills, continuous billet, sheet, bar and skelp mills, continuous strip mills, high-speed cold rolling sheet and strip

mills, continuous merchant and wire-rod mills, rail and structural mills, and special mills. For illustrated bulletin L-102-A, write Dept. 015, Loewy-Hydropress Division, BLH Corporation, 350 Fifth Avenue, New York 1, New York.



LOEWY-HYDROPRESS BALDWIN-LIMA-HAMILTON

DIVISIONS: Austin-Western • Eddystone • Hamilton
• Electronics & Instrumentation • Lima • Madsen •
Loewy-Hydropress • Pelton • Standard Steel Works

Nonferrous Prices (Effective May 29, 1966)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate (“F” temper except 6061-0)

Alloy	.032	.081	.136- .249	.250- 3
1100, 3003	42.3	40.2	39.0	38.0
5052	49.8	44.9	43.2	41.4
6061-0	46.9	42.7	40.9	40.8

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	43.1-44.8	58.1-61.7
12-14	43.8-45.2	59.0-63.3
24-26	46.8-47.2	69.2-73.6
36-38	55.1-55.7	92.0-95.8

Screw Machine Stock—2011-T-3

Size”	3/4	5/8	1/2	3/8
Price	56.0	54.9	53.6	51.6

Roofing Sheet, Corrugated

(Per sheet, 26” wide base, 16,000 lb)

Length” →	72	96	120	144
.019 gage	\$1.310	\$1.742	\$2.175	\$2.605
.024 gage	1.630	2.177	2.707	3.247

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type →	Gage →	.250- 3.00	.250- 2.00	.188	.081	.032
FSI Stand. Grade			65.6	66.5	75	100
FSI Spec.			88.9	91.1	103.5	163.1
Tread Plate			67.8	66.9		
Tooling Plate		70.2				

Extruded Shapes

factor →	6-8	12-14	24-26	36-38
Comm. Grade (FS)	66.4- 69.0	67.5- 69.6	72.1- 72.7	84.9- 85.8
Spec. Grade (AZ31B)	81.4- 84.0	82.5- 84.6	87.1- 87.7	99.9- 100.8

Alloy Ingot

AZ91B (Die Casting) 35 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 39.25 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	“A” Nickel Monel	Inconel
Sheet, CR	102	99
Strip, CR	102	92
Rod, Bar, HR	87	92
Angles, HR	87	93
Plate, HR	97	95
Seamless tube	122	153
Shot, blocks	71	

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	68.63			68.82
Brass, 70/30	56.60	57.14		59.51
Brass, Low	61.35	61.89	61.29	64.16
Brass, R L	63.07	63.61	63.01	65.88
Brass, Naval	59.80	65.06	54.11	62.96
Muntz Metal	57.84	51.85	53.65	
Comm. Br.	65.33	65.87	65.27	67.89
Mang. Br.	63.54	66.19	57.64	
Phos. Br. 5%	86.79	84.44	87.29	

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$12.10-
\$12.60; alloy, \$15.00-\$15.75; Plate, HR, com-
mercially pure, \$10.00-\$10.50; alloy, \$11.50-
\$12.00. Wire, rolled and/or drawn, commer-
cially pure, \$9.00-\$11.50; alloy, \$11.50; Bar, HR
or forged, commercially pure, \$7.55-\$7.80; alloy,
\$7.55-\$7.75.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb.	25.90
Aluminum pig	24.00
Antimony, American, Laredo, Tex.	33.50
Beryllium copper, per lb conta'd Be	\$43.00
Beryllium aluminum 5% Be, Dollars	
per lb contained Be	\$74.75
Bismuth, ton lots	\$ 2.25
Cadmium, del'd (per lb)	\$ 1.70
Cobalt, 97-99%	\$2.64 to \$2.66
Copper, electro, Conn. Valley	46.00
Copper, Lake, delivered	46.00
Gold, U. S. Treas., per troy oz.	\$35.00
Indium, 99.9% dollars per troy oz.	\$ 2.25
Iridium, dollars per troy oz.	\$100 to \$120
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig	33.75
ingot	34.50
Magnesium, sticks, 100 to 500 lb.	56.00
Mercury, dollars per 76-lb flask	
f.o.b. New York	\$264 to \$266
Nickel electro	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	\$23 to \$24
Platinum, dollars per troy oz.	\$103 to \$105
Silver, New York, cents per troy oz.	90.75
Tin, New York	96.25*
Titanium sponge, grade A-1	\$2.95 to \$3.25
Zinc, East St. Louis	13.50
Zinc, New York	14.00
Zirconium sponge	\$10.90

*Tentative

REMETLED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	41.00
No. 120	39.75
No. 123	38.75
80-10-10 ingot	
No. 305	44.25
No. 315	42.50
88-10-2 ingot	
No. 210	55.75
No. 215	52.00
No. 245	47.00
Yellow ingot	
No. 405	32.75
Manganese bronze	
No. 421	36.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	26.75-27.75
0.60 copper max.	26.50-27.50
Piston alloys (No. 122 type)	26.50-27.75
No. 12 alum. (No. 2 grade)	24.75-25.75
108 alloy	25.00-26.00
195 alloy	26.75-27.75
13 alloy (0.60 copper max.)	26.50-27.50
AXS-679	25.00-26.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97 1/2%	25.00-26.00
Grade 2—92-95%	24.25-25.25
Grade 3—90-92%	23.50-24.75
Grade 4—85-90%	23.00-23.75

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for
shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	42	41 1/4
Yellow brass	31 1/2	29
Red brass	37	36 1/4
Comm. bronze	38 1/2	37 1/4
Mang. bronze	28 1/2	28 1/4
Yellow brass rod ends	31	

Custom Smelters Scrap

(Cents per pound carload lots, delivered
to refinery)

No. 1 copper wire	34	34 1/2
No. 2 copper wire	32 1/2	33
Light copper	30	30 1/2
No. 1 composition	28 1/2	
No. 1 comp. turnings	28	
Hvy. yellow brass solids	19 1/2	
Brass pipe	20	
Radiators	21 1/2	

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered
to refinery)

No. 1 copper wire	34	34 1/2
No. 2 copper wire	32 1/2	33
Light copper	30	30 1/2
No. 1 composition	28 1/2	
No. 1 comp. turnings	28	
Hvy. yellow brass solids	19 1/2	
Brass pipe	20	
Radiators	21 1/2	

Aluminum

Mixed old cast 15 1/2—16 1/2
Mixed new clips 17—17 1/2
Mixed turnings, dry 15 1/2—16 1/2

Dealers' Scrap

(Dealers' buying price, f.o.b. New York
in cents per pound)

Copper and Brass	
No. 1 copper wire	34 — 34 1/2
No. 2 copper wire	32 1/2 — 33
Light copper	30 — 30 1/2
New type shell cuttings	26 — 26 1/2
Auto radiators (unsweated)	19 — 19 1/2
No. 1 composition	24 1/2 — 25
No. 1 composition turnings	23 1/2 — 24
Unlined red car boxes	18 — 19
Cocks and faucets	17 1/2 — 18
Clean heavy yellow brass	22 — 22 1/2
Brass pipe	22 — 22 1/2
New soft brass clippings	23 — 23 1/2
No. 1 brass rod turnings	20 1/2 — 21

Aluminum

Alum. pistons and struts	13 1/2 — 14
Aluminum crankcases	12 1/2 — 13
1100 (2S) aluminum clippings	15 1/2 — 16
Old sheet and utensils	12 1/2 — 13
Borings and turnings	8 — 8 1/2
Industrial castings	12 — 13
2024 (24S) clippings	15 1/2 — 16

Zinc

New zinc clippings	8 — 8 1/2
Old zinc	5 — 5 1/2
Zinc routings	3 — 3 1/2
Old die cast scrap	2 1/2 — 3

Nickel and Monel

Pure nickel clippings	\$1.65-\$1.90
Clean nickel turnings	\$1.50
Nickel anodes	\$1.65-\$1.90
Nickel rod ends	\$1.65-\$1.90
New Monel clippings	75-85
Clean Monel turnings	60-70
Old sheet Monel	65-75
Nickel silver clippings, mixed	25
Nickel silver turnings, mixed	21

Lead

Soft scrap lead	12 1/2 — 13
Battery plates (dry)	7 — 7 1/2
Batteries, acid free	4 1/2

Miscellaneous

Block tin	83 — 84
No. 1 pewter	62 1/2 — 63
Auto babbitt	42 — 42 1/2
Mixed common babbitt	13 1/2 — 14
Solder joints	18 1/2 — 19
Siphon tops	48
Small foundry type	15 1/2 — 16
Monotype	15 — 15 1/2
Lino. and stereotype	13 1/2 — 14
Electrotype	13 — 13 1/2
Hand picked type shells	10 1/2 — 11
Lino. and stereo. dross	5 1/2 — 6
Electro. dross	4 1/2 — 5

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL
PRICES(Effective
May 29, 1956)

		BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
EAST	Bethlehem, Pa.			\$96.00 B3		4.65 B3	6.80 B3	4.65 B3						
	Buffalo, N. Y.	\$68.50 B3	\$84.50 R3 B3	\$96.00 R3 B3	5.45 B3	4.65 B3	6.80 B3	4.65 B3	4.325 R3, B3	6.25 B3 6.25 R3, S10	6.425 B3	9.10 B3		
	Claymont, Del.													
	Harrison, N. J.													13.45 C11
	Canabohocken, Pa.								4.375 A2	6.30 A2	6.425 A2			
	New Bedford, Mass.									6.70 R6				
	Johnstown, Pa.	\$68.50 B3	\$84.50 B3	\$96.00 B3		4.65 B3	6.80 B3							
	Boston, Mass.									6.80 T8				13.80 T8
	New Haven, Conn.									6.70 D1 A5				
	Phoenixville, Pa.					5.15 P2		5.15 P2						
	Sparrows Pt., Md.								4.325 B3	6.25 B3	6.425 B3	9.10 B3		
MIDDLE WEST	Bridgeport, Wallingford, Conn.	\$73.50 N8	\$89.50 N8						4.625 N8	6.70 W1			7.50 N8	
	Pawtucket, R. I. Worcester, Mass.									6.80 N7 A5				13.80 N7 A5
	Alton, Ill.								4.50 L1					
	Ashtland, Ky.								4.325 A7					
	Canton-Massillon, Dover, Ohio		\$86.50 R3	\$96.00 R3										13.45 G4
	Chicago, Ill.	\$68.50 U1	\$84.50 R3, U1, W8	\$96.00 R3, U1, W8	5.45 U1	4.60 U1, W8	6.75 U1, Y1	4.60 U1	4.55 A1 4.325 N4, W8	6.35 A1, T8			7.20 W8	13.45 T8
	Cleveland, Ohio									6.25 A5, J3		9.30 A5		13.45 A5
	Detroit, Mich.			\$96.00 R5					4.425 G3, M2	6.35 D1, D2, G3 M3, F11	6.525 G3	9.20 D2, G3		
	Duluth, Minn.													
	Gary, Ind Harbor, Indiana	\$68.50 U1	\$84.50 U1	\$96.00 U1, Y1	5.45 I3	4.60 U1, I3	6.75 U1, I3		4.325 I3, U1, Y1	6.35 I3 6.25 Y1	6.425 I3, U1, Y1	9.30 Y1	7.20 Y1, U1	
	Sterling, Ill.								4.425 N4					
WEST	Indianapolis, Ind.									6.40 C9				
	Newport, Ky.												7.20 N5	
	Middletown, Ohio									6.45 A7				
	Niles, Warren, Ohio Sharon, Pa.	\$68.50 C10	\$84.50 C10	\$96.00 C10					4.325 S1, R3	6.25 S1, R3, T4	6.425 S1, R3	9.10 S1, R3	7.20 S1	13.45 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	68.50 U1, J3	\$84.50 J3, U1, C11	\$96.00 U1, C11	5.45 U1	4.60 U1, J3	6.75 U1, J3	4.60 U1	4.325 P8	6.25 S7, B4			7.20 S9	13.45 S9
	Portsmouth, Ohio													
	Weirton, Wheeling, Follensbee, W. Va.					4.60 W3			4.325 W3	6.25 P3, W3	6.425 W3	9.10 W3		
	Youngstown, Ohio		\$84.50 C10	\$96.00 Y1, C10			6.75 Y1		4.325 U1, Y1	6.25 Y1, C9	6.425 U1, Y1	9.30 Y1	7.20 U1, Y1	13.45 C9
	Fontana, Cal.	78.00 K1	94.00 K1	117.00 K1		5.30 K1	7.40 K1	5.45 K1	5.125 K1	6.80 K1	7.575 K1		8.95 K1	
	Geneva, Utah		\$84.50 C7			4.60 C7	6.75 C7							
	Kansas City, Mo.					4.70 S2	6.85 S2				6.675 S2		7.45 S2	
SOUTH	Los Angeles, Torrance, Cal.		\$94.00 B2	\$116.00 B2		5.30 C7, B2	7.45 B2		5.875 C7, B2	6.30 C1			8.40 B2	
	Minneapolis, Colo.					4.90 C6			5.425 C6					
	Portland, Ore.					5.35 O2								
	San Francisco, Niles, Pittsburg, Cal.		\$94.00 B2			5.25 B2, P9	7.40 B2		5.875 B2, C7					
	Seattle, Wash.		\$98.00 B2			5.35 B2	7.50 B2		5.325 B2					
	Atlanta, Ga.								4.525 A8					
	Fairfield, Ala. City, Birmingham, Ala.	\$68.50 T2	\$84.50 T2			5.10 C16 4.60 R3, T2	6.75 T2		4.325 R3, T2 4.625 C16		6.425 T2			
	Houston, Lone Star, Texas	\$74.50 L3	\$89.50 S2	\$101.00 S2		4.70 S2	6.85 S2				6.675 S2		7.45 S2	

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.												
STEEL PRICES (Effective May 29, 1956)		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE	
		Hot-rolled 10 ga. & byr.	Cold-rolled	Galvanized 10 ga.	Enamel-ing 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 B3	5.325 B3				6.375 B3	7.875 B3			5.375 W6	† Special coated milg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 125 lb. deduct \$2.20 from 1.25-lb. coke base box. * COKE: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 A2	5.375 A2				6.425 A2							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johantown, Pa.									5.375 B3				
	Fairless, Pa.	4.375 U1	5.375 U1				6.425 U1	7.925 U1				\$9.70 U1	\$8.40 U1	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 B3	5.325 B3	5.85 B3			6.375 B3	7.875 B3	8.60 B3		5.475 B3	\$9.70 B3	\$8.40 B3	
Worcester, Mass.										5.675 A5				
Trenton, N. J.														
MIDDLE WEST	Alton, Ill.										5.55 L1			
	Ashland, Ky.	4.325 A7		5.85 A7	5.90 A7									
	Canton-Massillon, Dover, Ohio			5.85 R1, R3										
	Chicago, Joliet, Ill.	4.55 A1 4.325 W8					6.375 U1				5.375 N4 5.375 A5, R3			
	Sterling, Ill.										5.475 N4			
	Cleveland, Ohio	4.325 J3, R3	5.325 J3, R3		5.90 R3		6.375 J3, R3	7.875 J3, R3			5.375 A5			
	Detroit, Mich.	4.425 G3, M2	5.425 G3, M2				6.475 G3	7.975 G3						
	Newport, Ky.	4.325 N5	5.325 N5	5.85 N5										
	Gary, Ind. Harbor, Indiana	4.325 J3, U1, Y1	5.325 J3, U1, Y1	5.85 U1, I3	5.90 U1, I3	6.25 U1	6.375 Y1, U1, I3	7.875 U1, Y1			5.375 Y1	\$9.60 J3, U1, Y1	\$8.30 J3, U1, Y1	7.65 U1, Y1
	Granite City, Ill.	4.525 G2	5.525 G2	6.05 G2	6.10 G2								\$8.40 G2	7.15 G2
	Kokomo, Ind.			5.95 C9							5.475 C9			
	WEST	Mansfield, Ohio	4.325 E2	5.325 E2			6.25 E2							
Middletown, Ohio			5.325 A7	5.85 A7	5.90 A7	6.25 A7								
Niles, Warren, Ohio Sharon, Pa.		4.325 S1, R3, N3	5.325 R3, N3	5.85 R3, 6.85 N3	5.90 N3	6.25 N3	6.375 S1, R3	7.875 R3				\$8.30 R3		
Pittsburgh, Pa. Midland, Pa. Butler, Pa.		4.325 J3, U1, P6	5.325 J3, U1, P6	5.85 U1	5.90 U1, A7		6.375 J3, U1	7.875 U1	8.60 U1		5.625 P6 5.375 A5	\$9.60 J3, U1	\$8.30 J3, U1	7.65 U1
Portsmouth, Ohio		4.325 P7	5.325 P7								5.375 P7			
Worlton, Wheeling, Fellershoe, W. Va.		4.325 W3, W5	5.325 W3, W5, F3	5.85 W3, W5		6.25 W3, W5	6.375 W3	7.875 W3				\$9.60 W3, W5	\$8.30 W3, W5	7.65 F3, W5
Youngstown, Ohio		4.325 U1, Y1	5.325 Y1		5.90 Y1		6.375 U1, Y1	7.875 Y1			5.375 Y1			
Fentona, Cal.		5.125 K1	6.525 K1				7.175 K1	9.075 K1				\$10.35	\$9.05	\$8.15
Genova, Utah		4.425 C7												
Kansas City, Mo.											5.625 S2			
Los Angeles Torrance, Cal.											6.175 B2			
Minneapolis, Colo.											5.625 C6			
SOUTH	San Francisco, Niles, Pittsburg, Cal.	5.825 C7	6.275 C7	6.60 C7							5.675 C7	\$10.35 C7	\$9.05 C7	
	Seattle, Wash.													
	Atlanta, Ga.													
SOUTH	Fairfield, Ala.	4.325 R3, T2	5.325 T2	5.85 R3, T2			6.375 T2				5.625 R3	5.625 R3 5.375 T2	\$9.70 T2	\$8.40 T2
	Alabama City, Ala.													
	Houston, Tex.										5.625 S2			

IRON AGE

STEEL
PRICES(Effective
May 29, 1956)

Italics identify producers listed in key at end of table. Base prices, f.a.b. mill, in cents per lb., unless otherwise noted. Extras apply.

	BARS						PLATES				WIRE
	Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Flat Plates	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem			5.575 B3	7.425 B3	6.80 B3					
	Buffalo, N. Y.	4.65 B3,R3	4.65 B3,R3	6.30 B3	5.575 B3,R3	7.425 B3,B5	4.50 B3,R3				6.60 W6
	Claymont, Del.						5.35 C4		6.30 C4	6.725 C4	
	Coatesville, Pa.						4.80 L4		6.30 L4	6.725 L4	
	Conshohocken, Pa.						4.50 A2	5.575 A2		6.725 A2	
	Harrisburg, Pa.						5.10 P2	5.575 C3			
	Hartford, Conn.		6.75 R3		7.725 R3						
	Johstown, Pa.	4.65 B3	4.65 B3		5.575 B3	6.80 B3	4.50 B3		6.30 B3	6.725 B3	6.60 B3
	Fairless, Pa.	4.80 U1	4.80 U1		5.725 U1						
	Newark, N. J.			6.70 W10		7.60 W10					
	Camden, N. J.			6.70 P10							
	Bridgeport, Putnam, Conn.	4.80 N8		6.80 W10	5.725 N8		4.750 N8				
	Sparrows Pt., Md.		4.65 B3				4.50 B3		6.30 B3	6.725 B3	6.70 B3
	Palmer, Worcester, Roadville, Mass.			6.70 W11		7.725 A5 B5	4.50 R3				6.60 A5
	Milton, Pa.	4.80 M7	4.80 M7	6.45 C14	6.70 B5						6.90 W6
	Spring City, Pa.			6.35 K4	7.60 K4						
MIDDLE WEST	Alton, Ill.	4.85 L1									6.775 L1
	Ashland, Newport, Ky.						4.50 A7,N5		6.30 N5		
	Canton-Massillon, Mansfield, Ohio	4.75 R3		6.25 R2,R3	5.575 R3,75	7.425 R2,R3,75	4.50 E1				
	Chicago, Joliet, Ill.	4.65 U1, N4,W8,R3, 5.15 P13	4.65 N4,R3, 5.15 P13	6.25 B5,W8, W10,A5,L2	5.575 U1,R3, W8	7.425 A5,W8, W10,L2,B5	4.50 U1,W8, 13,R3 4.725 A1	5.575 U1	6.30 U1	6.725 U1	6.60 A5,R3, N4,W7
	Cleveland, Ohio	4.65 R3	4.65 R3	6.25 A5,C13		7.425 A5,C13	6.80 R3	4.80 J3,R3	5.575 J3	6.725 R3,J3	6.60 A5, C13
	Detroit, Mich.	4.75 G3	4.75 G3	5.90 R5 6.45 B5 6.50 P3 6.10 P8	5.575 R5 5.675 G3	7.425 R5 7.625 B5,P3, P8	6.80 G3	4.80 G3		6.825 G3	
	Duluth, Minn.										6.60 A5
	Gary, Ind. Harbor, Crawfordsville	4.65 I3, U1, Y1	4.65 I3, U1, Y1	6.25 M5,R3	5.575 I3, U1, Y1	7.425 M5, R3	6.80 U1,I3, Y1	4.50 I3, U1, Y1	5.575 J3	6.30 U1,Y1	6.725 U1, I3,Y1
	Granite City, Ill.						4.70 G2				
	Kokomo, Ind.										6.70 C9
	Sterling, Ill.	4.75 N4	4.75 N4								6.70 N4
	Niles, Warren, Ohio, Sharon, Pa.	4.65 R3,C10		6.25 C10	5.75 C10	7.425 C10	6.80 R3	4.50 S1,R3		6.30 S1	6.725 S1
	Pittsburgh, Pa. Midland, Pa.	4.65 J3, U1, C11	4.65 J3, U1	6.25 A5,C8, C11,J3, W10,B4,R3	5.575 U1,C11	7.425 A5,C11, W10,C8,R3	6.80 J3, U1	4.50 J3, U1	5.575 U1	6.30 U1	6.725 J3, U1
	Portsmouth, Ohio										6.60 P7
	Weirton, Wheeling, Fallsashee, W. Va.	4.65 W3					4.50 W3,W5				
	Youngstown, Ohio	4.65 U1,Y1, C10,R3	4.65 U1,Y1, R3	6.25 Y1, U1	5.575 U1,Y1, C10	7.425 Y1,C10, P2	6.80 U1,Y1	4.50 U1,Y1, R3		6.30 Y1	6.725 Y1
WEST	Emeryville, Cal.	5.40 J5	5.40 J5								
	Fantana, Cal.	5.35 K1	5.35 K1		6.625 K1	7.50 K1	5.20 K1		7.80 K1	7.375 K1	
	Genova, Utah						4.50 C7			6.725 C7	
	Kansas City, Mo.	4.90 S2	4.90 S2		5.825 S2	7.85 S2					6.85 S2
	Los Angeles, Torrance, Cal.	5.35 B2,C7	5.35 B2,C7	7.70 R3	6.625 B2	7.50 B2				7.625 B2	7.55 B2
	Minneapolis, Colo.	5.10 C6	5.10 C6				5.35 C6				6.85 C6
	Portland, Ore.	5.40 O2	5.40 O2								
	San Francisco, Niles, Pittsburg, Cal.	5.35 C7 5.40 B2,P9	5.35 C7 5.40 B2,P9			7.55 B2					7.55 C7 7.55 C6
	Seattle, Wash.	5.40 B2,P12, N6	5.40 B2,P12			7.55 B2	5.40 B2		7.20 B2	7.625 B2	
											6.60 A8
SOUTH	Atlanta, Ga.	5.15 A8	5.15 A8							6.725 T2	6.60 R3, T2
	Fairfield, Ala. City, Birmingham, Ala.	4.65 T2,R3 5.15 C16	4.65 T2,R3 5.15 C16			6.80 T2	4.50 T2,R3				6.85 S2
	Houston, Ft. Worth, Lone Star, Tex.	4.90 S2	4.90 S2		5.825 S2	7.85 S2	4.85 L3 4.80 S2		6.40 S2	6.825 S2	

Steel Prices (Effective May 29, 1956)

Key to Steel Producers

With Principal Offices

- A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.
B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdboro, Pa.
C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shifting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shifting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.
D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Distant & Sons, Inc., Philadelphia
E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.
F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G1 Globe Iron Co., Jackson, O.

- G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
H1 Hanna Furnace Corp., Detroit
I1 Ingersoll Steel Div., Chicago
I2 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland
J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.
K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.
L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland
P1 Page Steel & Wire Div., Monaca, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.
R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebbing Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.
S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston
U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham
W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (per) f.o.b. mills. Base price about \$200 per net ton.

	BUTTWELD														SEAMLESS									
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.			
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.		
STANDARD T. & C.																								
Sparrows Pt. B3	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75										
Youngstown R3	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75										
Fentona K1	6.00	13.25	9.00	+9.25	11.50	+5.75	14.00	+4.00	14.50	+3.00	15.00	+2.50	16.50	+1.75										
Pittsburgh J3	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25		
Alton, Ill. L1	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75										
Sharon M3	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75										
Fairless N2	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75										
Pittsburgh N1	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25		
Wheeling W5	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75										
Wheatland W4	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75										
Youngstown Y1	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25		
Indiana Harbor Y1	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75										
Lerain N2	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25		
EXTRA STRONG PLAIN ENDS																								
Sparrows Pt. B3	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75										
Youngstown R3	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75										
Fairless N2	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75										
Fentona K1	10.50		14.50		16.50		17.00		17.50		18.00		18.50											
Pittsburgh J3	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75		
Alton, Ill. L1	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75										
Sharon M3	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75										
Pittsburgh N1	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75		
Wheeling W5	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75										
Wheatland W4	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75										
Youngstown Y1	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75		
Indiana Harbor Y1	22.00	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75										
Lerain N2	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75		

Threads only, butt weld and seamless 2 1/2 pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5 1/2 pt. higher discount. Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

P.O.B. Mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	\$1.60	T-1
18	4	1	—	5	2.305	T-4
18	4	2	—	—	1.765	T-2
1.5	4	1.5	8	—	.96	M-1
6	4	3	6	—	1.35	M-3
6	4	2	5	—	1.105	M-2

High-carbon chromium... .77 D-3, D-5
Oil hardened manganese... .43 O-2
Special carbon... .39 W-1
Extra carbon... .33 W-1
Regular carbon... .275 W-1
Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (A3, J2, L4)			Sheet (17)	
	10 pct	15 pct	20 pct	20 pct	
304.....	39.30	33.15	36.05	32.50	
316.....	35.50	38.45	41.40	47.00	
321.....	32.00	34.85	37.75	37.25	
347.....	34.40	37.90	41.40	48.25	
405.....	25.00	29.60	33.35		
410, 430.....	25.30	29.10	32.85		

CR Strip (89) Copper, 10 pct, 2 sides, 41.75; 1 side, 33.75.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

IRON WORKS			Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
Cities	City Delivery Charge		Hot-Rolled	Cold-Rolled	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Baltimore.....	\$.10		7.31	8.32	8.37	7.65	.....	7.63	7.93	7.61	8.62	14.38	13.44-13.96	16.36	16.29-16.49
Birmingham.....	.15		6.90	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston.....	.10		8.22	9.17	10.42	8.31	.....	8.51	8.37	8.37	9.83	.....	13.76	.....	16.76
Buffalo.....	.15		7.35	8.40	10.16	7.50	.....	7.80	7.75	7.50	8.05	.....	13.65	.....	16.55
Chicago.....	.15		7.28	8.39	9.25	7.36	.....	7.60	7.58	7.42	7.90	.....	13.30	.....	16.35
Cincinnati.....	.15		7.40	8.38	9.10	7.60	.....	7.89	8.05	7.66	8.30	13.59	13.55	16.44	16.60
Cleveland.....	.15		7.28	8.39	9.10	7.46	.....	7.77	7.91	7.48	8.15	13.41	13.36	16.26	16.41
Denver.....	.10		8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit.....	.15		7.47	8.58	9.53	7.49	.....	7.88	8.05	7.70	8.19	13.70	13.54	16.55	16.59
Houston.....	.....		7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85-9.95	14.35	14.00	17.15	17.05
Kansas City.....	.20		7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles.....	.10		8.25	10.10	11.10	8.60	.....	8.85	8.40	8.25	11.00	.....	14.50	.....	18.00
Memphis.....	.10		7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee.....	.15		7.37	8.48	9.34	7.45	.....	7.69	7.75	7.51	8.09	.....	13.39	.....	16.44
New Orleans.....	.15		7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York.....	.10		7.88	8.98	9.73	8.33	.....	8.31	8.21	8.26	9.87	.....	13.67	.....	16.67
Norfolk.....	.20		7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia.....	.10		7.44	8.54	9.51	8.09	.....	7.82	7.85	7.83	8.62	.....	13.45	.....	16.45
Pittsburgh.....	.15		7.28	8.39	9.55	7.46	9.25	7.60	7.58	7.42	8.15	13.85	13.30	16.25	16.20
Portland.....	.....		7.80-8.80-8.60	10.15	10.65	8.00	7.95	7.75	7.85-8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City.....	.20		.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco.....	.10		8.30	9.75	10.25	8.45	.....	8.40	8.35	8.25	11.55	.....	14.45	.....	18.00
Seattle.....	.00		8.75	10.50	10.90	8.90	.....	8.50	8.50	8.60	12.25	.....	14.65	.....	.....
St. Louis.....	.15		7.57	8.68	9.54	7.65	.....	7.89	7.98	7.71	8.44	.....	13.59	.....	16.64
St. Paul.....	.25		7.94	8.50-9.14	.....	9.89	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
Exceptions: (*) 1500 to 9999 lb. (*) 1000 lb or over. (*) \$2.25 delivery. (*) 1000 to 1999 lb, \$2.25 delivery.
*Plus analysis charge. †Deduct for country delivery.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field.....	8.40	8.60	.....
Armature.....	9.35	9.60	10.10
Elect.....	9.95	10.20	10.70
Motor.....	10.95	11.20	11.70
Dynamo.....	11.85	12.10	12.60
Trans. 72.....	12.80	13.05	13.55
Trans. 65.....	13.35	Grain Oriented	
Trans. 58.....	13.85	Trans. 80.....	17.45
Trans. 52.....	14.85	Trans. 73.....	17.95

Producing plants: Beech Bottom (W3); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zanesville (A2).
* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump.....	\$12.10
Old range, bessemer.....	11.25
Old range, nonbessemer.....	11.10
Mesabi, bessemer.....	11.00
Mesabi, nonbessemer.....	10.85
High phosphorus.....	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails		Wire Wire		Fence Posts		Single Loop Bale Ties		Galv. Barbed and Twisted Barbwire		Merch. Wire Ann'd		Merch. Wire Galv.	
	Cal	Col	Cal	Col	Cal	Col	Cal	Col	Cal	Col	Cal	Col	Cal	Col
Alabama City R3.....	152	162	.....	173	175	7.40	7.80	.....	.....	.....	.....	.....	.....	.....
Aliquippa, Pa. J3.....	152	162	.....	177	180	7.40	7.80	.....	.....	.....	.....	.....	.....	.....
Atlanta A6.....	154	167	.....	175	181	7.40	8.125	.....	.....	.....	.....	.....	.....	.....
Bartonsville K2.....	154	165	.....	175	179	7.50	7.90	.....	.....	.....	.....	.....	.....	.....
Buffalo W6.....	152	166	.....	175	179	7.50	8.10	.....	.....	.....	.....	.....	.....	.....
Chicago, Ill. N4.....	152	166	.....	175	179	7.50	8.10	.....	.....	.....	.....	.....	.....	.....
Cleveland A6.....	157	.....	.....	.....	.....	7.50	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland A5.....	157	.....	.....	.....	.....	7.40	.....	.....	.....	.....	.....	.....	.....	.....
Crawfordsville M4.....	154	168	.....	177	181	7.40	8.20	.....	.....	.....	.....	.....	.....	.....
Donora, Pa. A5.....	152	162	.....	175	175	7.50	7.90	.....	.....	.....	.....	.....	.....	.....
Duluth A5.....	152	162	.....	175	175	7.50	7.90	.....	.....	.....	.....	.....	.....	.....
Fairfield, Ala. T2.....	152	162	.....	175	175	7.50	7.90	.....	.....	.....	.....	.....	.....	.....
Galveston D4.....	157	.....	.....	.....	.....	7.40	.....	.....	.....	.....	.....	.....	.....	.....
Houston S2.....	157	170	.....	180	180	7.65	8.05	.....	.....	.....	.....	.....	.....	.....
Johnstown, Pa. B3.....	152	166	.....	175	175	7.40	7.80	.....	.....	.....	.....	.....	.....	.....
Juliet, Ill. A5.....	152	162	.....	175	175	7.50	8.10	.....	.....	.....	.....	.....	.....	.....
Kokomo, Ind. C9.....	154	154	.....	177	177	7.40	8.00	.....	.....	.....	.....	.....	.....	.....
Los Angeles B2.....	157	167	.....	178	180	7.40	8.925	.....	.....	.....	.....	.....	.....	.....
Kansas City S2.....	157	167	.....	178	180	7.40	8.05	.....	.....	.....	.....	.....	.....	.....
Minneapolis C6.....	157	167	.....	178	180	7.65	8.05	.....	.....	.....	.....	.....	.....	.....
Monessen P6.....	152	162	.....	.....	.....	7.40	7.80	.....	.....	.....	.....	.....	.....	.....
Moline, Ill. R3.....	152	162	.....	.....	.....	7.40	7.80	.....	.....	.....	.....	.....	.....	.....
Pittsburgh Cal. C7.....	171	185	.....	199	195	8.45	8.85	.....	.....	.....	.....	.....	.....	.....
Portsmouth P7.....	152	162	.....	.....	.....	7.50	.....	.....	.....	.....	.....	.....	.....	.....
Rankin, Pa. A5.....	152	162	.....	175	175	7.40	7.90	.....	.....	.....	.....	.....	.....	.....
So. Chicago R3.....	152	162	157	175	175	7.40	8.05	.....	.....	.....	.....	.....	.....	.....
S. San Francisco C6.....	152	162	.....	197	195	8.35	8.75	.....	.....	.....	.....	.....	.....	.....
Sparrows Pt. B3.....	154	.....	.....	175	181	7.60	8.20	.....	.....	.....	.....	.....	.....	.....
Struthers, O. Y1.....	158	.....	.....	.....	.....	7.50	8.00	.....	.....	.....	.....	.....	.....	.....
Worcester A5.....	158	.....	.....	.....	.....	7.70	8.20	.....	.....	.....	.....	.....	.....	.....
Williamsport, Pa. S3.....	160	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Galvanized products computed with zinc at 5¢ per lb. Exceptions: zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bristol, Conn. W12.....	.....	.....	10.90	13.05	15.75
Buffalo, N. Y. R7.....	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. S9.....	.....	9.05	10.60	12.75	15.35
Cleveland A5.....	7.10	9.05	10.60	12.75	15.45
Detroit D1.....	7.20	9.15	10.70	12.85	.....
Detroit D2.....	7.20	9.15	10.70	12.85	.....
Harrison, N. J. C11.....	.....	.....	10.90	13.05	15.75
Indianapolis C5.....	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. B4.....	7.00	8.95	10.50	12.65	.....
New Haven, Conn. D1.....	7.55	9.35	10.90	13.05	.....
Pawtucket, R. I. N7.....	7.65	9.35	10.90	13.05	15.75
Pittsburgh S7.....	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. A1.....	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. S1.....	7.10	9.05	10.60	12.75	15.45
Trenton R4.....	.....	.....	10.90	13.05	15.75
Wallingford W1.....	7.55	9.35	10.90	13.05	15.75
Warren, Ohio T4.....	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. W3.....	7.10	8.95	10.50	12.65	.....
Worcester, Mass. A5.....	7.65	9.35	10.90	13.05	15.75
Youngstown C5.....	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox.	2	13	32.09	37.37	29.93	.....
	2½	12	43.22	50.31	40.31	.....
	3	12	49.90	58.10	46.55	.....
	3½	11	58.26	67.83	54.34	.....
	4	10	77.36	99.07	72.17	.....
National Tube.....	2	13	32.09	37.37	29.93	.....
	2½	12	43.22	50.31	40.31	.....
	3	12	49.90	58.10	46.55	.....
	3½	11	58.26	67.83	54.34	.....
	4	10	77.36	99.07	72.17	.....
Pittsburgh Steel...	2	13	32.09	37.37	.....	.....
	2½	12	43.22	50.31	.....	.....
	3	12	49.90	58.10	.....	.....
	3½	11	58.26	67.83	.....	.....
	4	10	77.36	99.07	.....	.....

RAILS, TRACK SUPPLIES

F.a.b. Mill Cents Per Lb	No. 1 Std. Light	Light	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Unthreaded
Bessemer U1	4.725	5.65	5.825				
So. Chicago R3				8.05			
Ensley T2	4.725	5.65					
Fairfield T2		5.65		8.05	5.625		
Gary U1	4.725	5.65			5.625		
Ind. Harbor J3	4.725		5.825	7.90	5.625		
Ind. Harbor Y1				8.05			
Johnstown B3		5.65					
Joliet U1			5.825				
Kansas City S2				7.90			
Lockawanna B3	4.725	5.65	5.825		5.625		
Lafayette B3						12.15	
Marquette C6	4.725	4.15	5.825	7.90	5.625	12.15	
Pittsburgh O1						11.90	12.15
Pittsburgh P5							12.15
Pittsburgh J3				8.05			
Seattle B2				8.40	5.775	12.65	
Stanton B3	4.725		5.825		5.625		
Strohman Y1				8.05			
Torrance C7					5.775		
Williamport S3		5.65					
Youngstown R3				8.05			

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$17.00 to \$18.00
Foundry, oven coke	
Buffalo, del'd	\$28.75
Chicago, f.o.b.	27.00
Detroit, f.o.b.	27.50
New England, del'd	28.55
Seaboard, N. J., f.o.b.	26.75
Philadelphia, f.o.b.	26.50
Swedeland, Pa., f.o.b.	26.50
Painesville, Ohio, f.o.b.	27.50
Erle, Pa., f.o.b.	27.50
Cleveland, del'd	29.43
Cincinnati, del'd	28.59
St. Paul, f.o.b.	26.50
St. Louis, f.o.b.	28.50
Birmingham, f.o.b.	25.65
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	94	23.90	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	80	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	60	30.25	10	60	11.80
3	60	32.00	8	60	12.10
2 1/2	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes	
(Cents per lb, frt allowed in quantity)	
Copper	
Cast elliptical, 18 in. or longer,	
5000 lb lots	64.42
Electrodeposited	56.78
Brass, 80-20, ball anodes, 2000 lb	
or more	60.00
Zinc, ball anodes, 2000 lb lots	21.25
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon	90.50
(rolled depolarized add 3¢ per lb)	
Cadmium	\$1.70
Tin, ball anodes and elliptical	\$1.06 to \$1.10
Chemicals	
(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum	83.50
Copper sulphate, 5 or more 100 lb	
bags, per cwt	21.15
Nickel salts, single, 4-100 lb bags	43.25
Nickel chloride, freight allowed,	
300 lbs	43.50
Sodium cyanide, domestic, fob N. Y.	
200 lb drums	21.55
(Philadelphia price \$1.80)	
Zinc cyanide, 100 to 300 lb	55.55
Potassium cyanide, 100 lb drum	
N. Y.	48.00
Chromic acid, flake type, 1 to 20	
100 lb drums	30.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts	
	Full	Quantity or more
3/4 in. & smaller x 6 in. & shorter	61	63
Larger than 3/4 in. diam. and all diam. longer than 6 in.	55	57
Roller thread carriage bolts		
3/4 in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex, HP, reg. & hvy.

3/4" or smaller	64	66
3/4" to 1 1/4" inclusive	63	65
1 1/4" to 1 3/4" inclusive	65	67
1 3/4" and larger	61	63

C.P. Hex regular & hvy.

3/4" or smaller	64	66
3/4" and larger	61	63

Hot Galv. Nuts (all types)

1 1/4" or smaller	44	47
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Finished, Semi-finished, Hex Nuts

3/4" and smaller	66	68
3/4" and larger	63	65
Add 25¢ for less than case or keg quantity.		

Rivets

	Base per 100 lb	
	Pet	Off List
3/4 in. and larger	\$9.95	
7/16 in. and smaller		\$3

Cap Screws

	Discount	
	H.C.	Heat
Bright Treated		
New std. hex head, packaged		
1/4" thru 3/4" diam. x 6"	34	30
1/4" and shorter		
9/16" and 5/8" x 6" and smaller and shorter	31	18
3/4" 1" x 6" and shorter	9	+11
New std. hex head, bulk		
1/4" thru 3/4" diam. x 6"		
and shorter	49	41
9/16" and 5/8" diam. x 6"		
and shorter	43	39
3/4" 1" x 6" and shorter	31	30
*Minimum quantity per item:		
15,000 pieces 1/4", 5/16", 3/8" diam.		
5,000 pieces 7/16", 1/2", 9/16", 5/8" diam.		
2,000 pieces 3/4", 1" diam.		

Machine Screws & Stove Bolts

	Discount	
	Mach.	Stove
	Screws	Bolts
Packaged, package list	27	28
Bulk, bulk list		
Quantity		
1/4-in. diam.	25,000-200,000	30 61
& under		
5/16-in. diam. & larger	15,000-100,000	30 61
All diam. over 3 in. long	5,000-100,000	— 61

Machine Screw & Stove Bolt Nuts

	Discount	
	Hex	Square
Packaged, package list	24	27
Bulk, bulk list		
Quantity		
3/4-in. diam. & smaller	25,000-200,000	18 30

CAST IRON WATER PIPE INDEX

Birmingham	111.3
New York	123.7
Chicago	126.7
San Francisco-L. A.	134.3
Dec. 1955 value, Class B or heavier 4 in. or larger, bell and spigot pipe. Explanation: p. 27, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.	

REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill. Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$123.00
No. 1 Ohio	
Sec. quality, Pa., Md., Ky., Mo., Ill.	\$114.00
No. 2 Ohio	\$98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$128.00
Childs, Hays, Pa.	138.00
Chicago District	138.00
Western Utah	144.00
California	161.00

Super Duty

Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	23.00
Silica cement, net ton, bulk, Utah and Calif.	23.00

Chrome Brick

Standard chemically bonded, Balt.	\$91.00
Standards chemically bonded, Curtner, Calif.	101.25
Burned, Balt.	85.00

Magnesite Brick

Standard Baltimore	\$114.00
Chemically bonded, Baltimore	103.00

Grain Magnesite

Domestic, f.o.b. Baltimore	
in bulk fines removed	\$64.00
Domestic, f.o.b. Chewah, Wash.,	
Luning, Nev.	
in bulk	40.00
in sacks	46.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	\$15.00
Midwest	15.50
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.	
Swedish sponge iron c.i.f.	
New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.50¢
Domestic sponge iron, 95+%	
Fe, carload lots	9.50¢
Electrolytic iron, annealed, imported 99.5+%	27.50¢
domestic 99.5+%	26.50¢
Electrolytic iron, unannealed minus 325 mesh, 99+%	57.00¢
Electrolytic iron melting stock, 99.84% pure	22.00¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+%	\$6.00¢ to \$1.55
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	\$7.50¢ to \$8.00¢
Copper, electrolytic	59.50¢
Copper, reduced	59.50¢
Cadmium, 100-199 lb. 99% plus metal value	
Chromium, electrolytic 99.80%	
min. Fe .03 max. Del'd	\$5.00
Lead	8.90¢ plus metal value
Manganese	79.90¢
Molybdenum, 99%	\$3.00 to \$3.25
Nickel, unannealed	\$1.00
Nickel, annealed	\$1.00
Nickel, spherical, unannealed, #20	\$1.13
Silicon	43.50¢
Solder powder, 7.0¢ to 9.0¢ plus metal value	
Stainless steel, 302	39.00¢
Stainless steel, 316	\$1.23
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	\$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢

Ferroalloy Prices

(Effective May 29, 1956)

Ferrochrome

Contract prices, cents per lb contained	
Cr, lump, bulk, carloads, del'd, 67-71% Cr, 30-1.00% max. Si	
0.02% C ... 35.50	0.20% C ... 35.50
0.03% C ... 35.00	0.50% C ... 35.25
0.06% C ... 36.50	1.00% C ... 34.00
0.10% C ... 36.00	1.50% C ... 33.85
0.15% C ... 35.75	2.00% C ... 33.75
4.00-4.50% C, 67.70% Cr, 1-2% Si ... 26.25	
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si ... 25.00	
0.025% C (Simplex) ... 31.75	
0.10% C, 50-52% Cr, 2% max Si ... 33.75	
8.50% max. C, 50-55% Cr, 3-6% Si ... 22.50	
8.50% C, 50-55% Cr, 3% max Si ... 22.50	

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe	
0.10% max. C ... 12.27	
0.50% max. C ... 1.27	
9 to 11% C, 33-91% Cr, 0.75% Fe ... 1.36	

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (1/4" thick) delivered packed. 99.80% min. Cr (Metallic Base) Fe 0.20 max.	
Carloads ... 1.25	
Ton lots ... 1.27	
Less ton lots ... 1.29	

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.)	
Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.	
Ton lots ... 41.35	
Less ton lots ... 46.15	
Less ton lots ... 48.65	

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.	
30-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads ... 22.95	
Ton lots ... 25.25	
Less ton lots ... 26.75	

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads ... 23.05	
Ton lots ... 24.95	
Less ton lots ... 25.95	

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 6-7% Zr, 20% Fe 1/2 in. x 12 mesh.	
Ton lots ... 19.65	
Less ton lots ... 20.90	

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots ... 17.20	
Ton lots ... 18.70	
Less ton lots ... 19.95	

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed ... 18.50	
Ton lots to carload packed ... 19.65	
Less ton lots ... 20.90	

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.	
Producing Point	per lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.75
Johnstown, Pa.	10.75
Sheridan, Pa.	10.75
Philo, Ohio	10.75
S. Duquesne	10.75
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.	
Briquets, delivered, 66 pct Mn:	
Carloads, bulk ... 13.00	
Ton lots packed ... 15.20	

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.	
Manganese Silicon	
16 to 19% 3% max. \$92.00	
19 to 21% 3% max. 94.00	
21 to 23% 3% max. 96.50	

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed ... 45.75	
Ton lots ... 47.25	

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads ... 31.5	
Ton lots ... 33.5	
250 to 1999 lb ... 36.5	
Premium for hydrogen removed metal ... 0.75	

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ... 22.85	
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Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.	
Carloads Ton Less	
0.07% max. C, 0.06% P, 90% Mn ... 34.00 36.55 37.75	
0.07% max. C ... 31.95 34.50 35.70	
0.10% max. C ... 31.20 33.75 34.95	
0.15% max. C ... 30.45 33.00 34.20	
0.30% max. C ... 28.95 31.50 32.70	
0.50% max. C ... 28.45 31.00 32.20	
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ... 25.45 28.00 29.20	

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.	
Carload bulk ... 12.00	
Ton lots ... 13.45	
Briquet contract basis carloads, bulk, delivered, per lb of briquet ... 13.55	
Ton lots, packed ... 15.75	

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	
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Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.	
Ton lots Carloads	
96.50% Si, 2% Fe ... 22.75 21.45	
98% Si, 1% Fe ... 23.25 21.95	

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.	
Carloads, bulk ... 7.15	
Ton lots, packed ... 9.75	

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.	
50% Si ... 12.75 75% Si ... 15.40	
65% Si ... 14.50 85% Si ... 17.10	
90% Si ... 18.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.	
Cast Turnings Distilled	
Ton lots ... \$2.05 \$2.95 \$3.75	
Less ton lots ... 2.40 3.30 4.55	

Ferrovandium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.	
Openhearth ... 3.10	
Crucible ... 3.20	
High speed steel (Primos) ... 3.30	

Alsiifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.	
Carloads ... 10.65¢	
Ton lots ... 11.80¢	

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo ... \$1.34	
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Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.	
Ton lots ... \$6.90	
Less ton lots ... 6.95	

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta ... \$4.65	
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Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo ... \$1.54	
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Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton ... \$90.00	
10 tons to less carload ... \$110.00	

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... \$1.35	
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Ferrotitanium 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... \$1.50	
Less ton lots ... \$1.55	

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... \$177.00	
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Ferrotungsten, 1/4 x down, packed, per pound contained W, ton lots, delivered ... \$3.45	
--	--

Molybdenic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. ... \$1.32	
bags, f.o.b. Washington, Pa., Langeloth, Pa. ... \$1.30	

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb. Carload, bulk lump ... 17.50¢	
Ton lots, packed lump ... 19.50¢	
Less ton lots ... 20.00¢	

Vanadium oxide, 86-89% V ₂ O ₅ contract basis, per pound contained V ₂ O ₅ ... \$1.88	
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Zirconium contract basis, per lb of alloy	
35-40% f.o.b. freight allowed, carloads, packed ... 26.25¢	
12-15% del'd lump, bulk-carloads ... 8.50¢	

Boron Agents

Borasil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B 3.14%, Si 40-45%, per lb contained 2 ... \$5.25	
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Bortam, f.o.b. Niagara Falls	
Ton lots, per pound ... 45¢	
Less ton lots, per pound ... 50¢	

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed	
Ton lots per pound ... 10.00¢	

Ferroboration, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20	
f.o.b. Wash., Pa.; Niagara Falls, N. Y., delivered 100 lb up	
10 to 14% B ... .85	
14 to 19% B ... 1.20	
19% min. B ... 1.50	

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over	
No. 1 ... \$1.05	
No. 79 ... 50¢	

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.	
D, del'd ... \$1.48	
Ton lots ... 1.57	

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... \$2.05	
---	--

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FREIGHT CAR REPAIR PARTS

For All Types of Cars

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15 — 70-Ton Capacity, All-
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REPAIRED—IMMEDIATE DELIVERY!

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Cleaned and Tested

ALL STEEL ORE CARS

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or STEEL"**

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Rough Sailing . . . Used machinery houses in Northeastern Ohio are facing a few rough months ahead, according to several dealers.

Machines which normally flow to them through replacement or retirement—which they can recondition and resell—are simply not to be found. These days machine shops and other natural sources have dried up from the used machinery salesman's standpoint because, when new machines are delivered, old ones are kept as a hedge against a new business boom.

Used Higher Than New . . . This has naturally shot the bidding price up for the few machines available and in some cases in Cleveland, such as a small tool-room mill, the used price is higher than an equivalent new model. Governing factor on this economic contradiction is that delivery on the new models is extended and on the used tools it is short term.

The used machinery salesman, too, is now wearing a buyer's hat with most of his time spent scouting around for usable machinery with authorization in his pocket to pay any reasonable amount for nuggets uncovered.

Auto Drop No Aid . . . Used machinery dealers in Northeastern Ohio have stayed even with the game thus far by selling out their inventory to keep sales up. One leading Cleveland dealer last week said that sales were about equal to volume at this time last year but inventories now are down to half or less than last year.

Although Cleveland is one of the main auto parts suppliers in the country, the drop in production hasn't helped at all. Despite cutbacks in orders to stampers and production shops, they are continuing to hold on to old machines even after new ones ar-

rive. With used machinery dealer inventories just about down to the bare boards, a tough two or three months are in the making. And there's no ready solution now in sight.

On The Other Hand . . . Checking in the Philadelphia area, however, indicated that, while demand was generally good, supplies, too, were available.

Sales seemed to be continuing to maintain a good steady pace despite the approaching summer season. The market for older model tools was felt to be tightening, but later-made units were moving well. Opportunities for dealers to buy were plentiful.

Demand and supply for millers and lathes was good, but boring mill sales were described as "very spotty."

Horizontal millers were wanted, as were shears, but both were difficult to obtain. Sales of cranes and hoists were at a good level.

One dealer indicated good customer interest in sheet metal shears and press brakes, but indicated sales in all lines were as good as ever.



"I just ran into something big I think you'll be interested in, George."

CONSIDER GOOD USED EQUIPMENT FIRST

BALE
Galland Henning Model 100 TC Baler, Box 51" x 37"
x 85", Bale Size 350 to 500 lbs.

BENDING ROLLS
6" x 3/4" Kling Pyramid Type
6" x 3/4" Niles Initial Type
12" x 3/4" Cleveland Pyramid Type
16" x 3/4" Niles Pyramid Type
27" x 1" Southwark Pyramid Type

BRAKE—PRESS TYPE
12" x 3/4" Dreis & Krump
12" x 3/4" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
12" x 3/16" Cincinnati

BULDOZERS
#5 Williams & White, 20" Stroke, 1 1/4" x 63" Face
of Crosshead
#27 Williams & White, 22" Stroke 16" x 80" Face
of Crosshead

CRANES—OVERHEAD ELECTRIC TRAVELING
5 ton P&H 29' Span 230 Volt D.C.
5 ton Shepard Niles 48' Span 250 Volt D.C.
5 ton Shepard Niles 35' Span 250 Volt D.C.
5 ton P&H 80' Span 220/3/60 A.C.
5 ton P&H 80' Span 500/3/60 A.C.
5 ton Cleveland 80' Span 250 Volt D.C.
5 ton Cyclops 40' Span 220/440 A.C.
10 ton P&H 77' Span 230 Volt D.C.
10 ton Milwaukee 80' Span 230 Volt D.C.
10 ton Shepard Niles 87' Span 250 Volt D.C.
10 ton P&H 96' Span 220 Volt D.C.
15 ton Chesapeake 87' Span 250 Volt D.C.
25 ton Niles 87' Span 250 Volt D.C.
50 ton Hand Opr. 104' Span
120 ton Whiting 80' Span 220/3/60 A.C.

CUT OFF MACHINES
Yoder AD-2 Cut-off, Max. Capacity 3/4" O.D.
Yoder Type L Flying Cut-off, Cap. 7/8" to 3" Tubing

FORGING MACHINE
1" to 5" Acme, Ajax, National

FURNACE
30 KVA Allis Chalmers Induction Melting Furnace
Mercury Arc Converter

HAMMERS BOARD DROP—STEAM DROP
STEAM FORGING—400 lb. to 20,000 lb.

LEVELLERS—ROLLER
60" United 17 Rolls 5 1/2" Dia.
72" McKay 17 Rolls 4 1/2" Dia.
84" McKay Type E. 17 Rolls 5 1/2" Dia.

MULTI SLIDE MACHINE
No. 35 U. S. Multi Slide Machine with Edgewise
Stock Straightener

PRESS—GAP FRAME
125 ton Beatty Inclined Open Back Gap Press, Stroke
1 1/4" Bed Area 28 1/2" x 16 1/2" (New)

PRESSES—HYDRAULIC
530 ton Baldwin Southwark 12" stroke 48" x 25"
Between Columns
1500 ton 4-Col., 24" Stroke, 40" Bet. Columns
1257 ton Baldwin Southwark Forging Press, 30"
Stroke Main Ram, 54" x 41" Bet. Columns
4500 ton B-L-H Hydr. Forging Press

PRESSES—STRAIGHT SIDE
60D-84 Cleveland Double Crank 14" Stroke Bed Area
40" x 84"
Clearing Model TP41500-200 Triple Acting Strokes
40, 32, 14", Bed Area 100" x 200"

PUNCH & SHEAR COMBINATIONS
Style EP Cleveland 85" Throat, Punch 1 1/4" thru 1"
Style W Cleveland 60" Throat, 312 Ton

ROLLING MILLS
10" x 16" Single Stand, Two High
12" x 16" Phila., Single Stand, Two High
12" x 26" Standard Single Stand, Two High

15" x 28" Farrel Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
22" x 12" x 40" Lewis 3-High Sheet Mill
12" Three High Bar Mill
28" x 54" United Single Stand, Two High
8" Forging Ring Type Reversing Mill
For cold reducing 1" wide strip

SHEAR—BAR
Pels Type 18-23, Capacity 2" Rd., 1 1/4" Sq.

SHEAR—BILLET
No. 7 Hillis & Jones, Motor Drive, Cap. 5" Sq.

SHEARS—GATE
80" x 3/4" Pels
86" x 1" Hillis & Jones

SHEAR—ANGLE
6 x 6 x 3/4" Cleveland

SHEARS—SQUARING
12" x 3/16" Cincinnati #1412
12" x 3/4" Niagara, NEW 1951
12" x 3/4" Steelweid

SLITTERS
36" Yoder Slitting Lipe
G-48 Yoder Gang Slitter, 5" Threaded Arbor

STRAIGHTENERS
Rane & Roosa 3 Roll Rotary Straightener, M.D.
Capacity Mildsteel 1/4" to 3/4"
Aetna Standard 12 Roll Straightener, Capacity 2"

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60,000, 100,000, 200,000 Olesco & Riehle Universal
50,000 and 300,000 lb. Compression

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Synco BCS 14 Die Wire Drawing Machine with
Spooler & Blocks. Entering Size Max. 1.05", Finish
Min. .0104" low carbon steel

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#3 Abramson Bar & Tube Straightener

Pels FV-75 Bar & Biller Shear, Cap. 7 1/2" rd
10" x 1/2" Plate Shear, Long & Allistatter 10"
throat, M.D. Rebuilt

10" x 1" Long & Allistatter Plate Shear

Hillis & Jones and Buffalo Shears 1 1/2", 2",
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Machines from 3/8" to 4"

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GrinderBOLT, NUT AND RIVET MACHINERY, COLD
HEADERS, THREAD ROLLERS, THREADING
MACHINES, TAPPERS, COLD BOLT TRIM-
MERS, SLOTTERS, HOT HEADERS AND TRIM-
MERS, COLD AND HOT PUNCH NUT
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1913 W. 74th Street, Chicago 36, Ill.6' arm 19" col. CARLTON RADIAL DRILL.
48 Spindle Speeds 10 to 1000 RPM.
20 HP. A.C. Motor Drive. New in 1943.
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A. C. MOTORS 3 phase—60 cycle

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT	6900	1187
1	1100	G.E.	IM	2300	720
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT-424Y	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.	CW	2300	500
1	500	Whase.	CW-960A	440	1170
1	400	Whase.	CW	440	514
1	400	Whase.	CW-1213	2200	435
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-5598	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	290R	440	505
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150 (unused)	Whase.	CW	2300	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

Qu.	H.P.	Make	Type	Volts	Speed
1	800	G.E.	KT-573	2200	1180
2	650	G.E.	FT-559BY	440	8570
1	450	Whase.	CS-1420	2300/4150	354
1	400	G.E.	IE-15B	2200	1145
1	400	G.E.	IK	2200	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-537	440	1800
1	150/75	G.E.	IK	440/900/450	
1	150	Whase.	CS-8568	440	880
1	150	Whase.	CS	440	580
2	125	Al. Ch.	ARKW	2200	1750
1	100	Whase.	CS-876C-TEFC	440	710

Qu.	H.P.	Make	Type	Volts	Speed
2	2000	Whase.		2300	120
2	1750	G.E.	ATI	2300	3600
1	735	G.E.	ATT	2200/12000	600
1	500	Ideal	SM	2300/4150	1800
2	500	G.E.	TS-7567	2200	1200
1	450	Whase.		2200	129.5
1	450	Whase.		2200	450
1	400	G.E.	TS-7565	2200	1200
1	400	G.E.	TS	2200	400
1	375	C.W.	3501SL1000/6900/13500	514	
1	325	G.E.	ATI	440	1800
1	225	G.E.	ATI	440	1800

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Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whase.	720	600	4160/2300
1	2000	Al. Ch.	720	250	4160/2300
1	1200	Whase.	720	600	2300
1	1120	Elliot	720	260/280	2300
1	500	G.E.	1200	250	2300/440
1	500	Ch. Wh.	720	575/600	2300/440
1	300	G.E.	1200	250/275	2300
1	200	Elliot	1200	125	4000/2300
1	150	G.E.	1200	250	2300/440
1	120	Whase.	1200	250	2300/440
1	100	Al. Ch.	1200	250	4000/2300

DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	3000	Whase.	Mill	525	600
6	1500	Whase.	Mill	525	600
4	700	Whase.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	600	Whase.	Mill	250	110/220
2	500	Whase.	Mill	250	285/710
1	450	Whase.	SK	230	450/600
1	350	G.E.	CD-169	230	1150
1	300	Whase.	Mill	230	300
4	275	Whase.	QM	230	425/850
1	200/250	EL. Dy.	Fed. Brg.	230	400/1200
1	200	Whase.	SK-210	230	400/800
1	180	G.E.	MP2	230	300
1	150	Whase.	SK-201	230	300/900
2	125	Whase.	SK-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	EL. Dy.	30-S	230	450/1350
2	100	EL. Dy.	30-S	230	475/950
1	80	Reliance	651-T	230	575/1150
1	60/80	EL. Dy.	25S	230	325/1150
1	40	G.E.	CD-123	230	300/1000
1	40	Whase.	SK-150	230	500/1700
1	32 1/2	Whase.	SK-150	230	400/1200
2	25	Whase.	SK-92	230	1800
1	20	Cr. Wh.	D.P.B.B.	230	1150/2400
1	20	Whase.	SK-123	230	400/1200
1	15	G.E.	CD-85	230	575/2300
3	15	Whase.	SK-100L	230	500/1500
1	15	Reliance	155-T	230	400/1600
1	10	Whase.	SK-108	230	400/1600
1	10	Al. Ch.	E-122	230	300/1200
4	10	Whase.	SK-91	230	250/1000
1	7 1/2	G.E.	CD-75	230	690/2070
1	7 1/2	G.E.	CD-85	230	450/1350
4	5 7/8	Reliance	T.E.F.C.	230	337/1350

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900 TON TOLEDO KNUCKLE JOINT PRESS NO. 665, 27" x 32" Bed, 2" Stroke, 18" Shut Height 32 Strokes per min. Photograph on Request.

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36" HALDEN GUILLOTINE FLYING SHEAR, Type 51, with Integral 17 Roll Leveler & Pinch Rolls, 20-34 Gage, 15" to 144" Sheets.

38" YODER SIDE TRIMMING SLITTER, 16" Min to 38" Max. Cut, 18 to 38 gage, Complete with Scrap Blatter.

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SERIES WOUND—230 VOLTS DC.
2—65 HP Shaw, Type Z, 465 RPM Class RME
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1—18 HP Shaw, Type Z, 520 RPM
4—5 HP West, Type K-2, 600 RPM Ball Bearing
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50 TON OVERHEAD ELECTRIC TRAVELLING CRANE 100' Span, 230 Volts DC, with 2-25 Ton Trolleys and 5 Ton Aux. Hoist. Very Low Price.

10 TON SHEPARD NILES ELECTRIC TRAVELLING CRANE, 45' 10" Span, 230 Volts DC, Cab Equipped with West. K Motors. We have four identical Cranes.

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CONTINUOUS HARDENING & DRAW FURNACES, Each 45" Wide x 14" High x 29' Long, 1650 F. Hardening, 1300 F. Draw 1900 Lbs/hr. Belt Type Conveyor, Gas Fired.

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STEEL MILL BUILDING & CRANE

200' x 70' Heavy Duty Structural Steel Mill Building with 15 ton Overhead Electric Travelling Crane Including new dismantled & Matched Marked for Re-erection. Very Attractive Price. Call Collect.

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72" Hanchett S-spd, rotary surface, new 1948.
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No. 22A5 Head hyd. pl. internal, extended bridge, 1943.
No. 74 Head hyd. pl. internal, X-sliding H.S., 1941.
No. 72A3 Head hyd. pl. internal, X-sliding H.S., 1941.
12" x 24" Cincinnati ER hyd. universal syl., 203B1H-S.
14" x 36" Landis type C hyd. pl. cylindrical, 1942.
6" x 30" Cincinnati EA Filmatic pl. cylindrical, 1942.

HAMMERS

No. 6-1 Nazel, pneumatic, late
No. 3N Nazel, self-contained.
No. 6B Nazel, self-contained.

LATHES

No. 3 Gisholt Univ. Turret Lathes (2), 1942.
24" x 6' LeBlond H. D. engine lathe.
14" x 6' Hendey Toolroom, 1940.
15" x 30" Lipe Carbo-Matic, 1942.
120" x 96" CC Niles Cement Pond engine lathe, 80 HP M.D.

90" swing Betts Bridgeford H.D. engine lathe, late.

PLANERS

36" Rockford Hyd. Openside Shaper-Planer.
42" x 42" x 12" Liberty dbl. housing planer, 35 HP M.D.

48" x 48" x 10" Gray Maxi-Service.

PRESSES

90 ton No. 92 1/2 C Toledo D.C. Str. Side.
260 ton No. 795 1/2 Toledo D.C. Toggle drawing.
500 ton No. 1039 Hamilton D.C. adj. bed, 60" x 102".
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24" Gould & Eberhardt Universal.
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36" Rockford openside hyd. shaper-planer, ser. 39HU35.

36" Rockford hyd. vertical slotter, new 1944.

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3 1/2" Ajax suspended slides, steel frame.
1 1/2" National Upsetter, guided ram, hard ways.
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1000 Tools in Stock
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PRACTICALLY NEW DOUBLE CRANK PRESSES

Bliss No. 9-108W, cap. 400 tons, Bed 108" x 60".
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Minster No. 50-72, cap. 200 tons, Bed 72" x 50".
Bliss No. 6-84W, cap. 140 tons, Bed 84" x 36".
Bliss Toledo No. 93 1/2-J, cap. 140 tons, Bed 108" x 48".

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No. 151 Besly, m.d.
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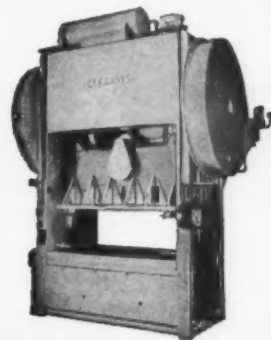
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May 31, 1956

METALWORKING BRIEFS

February Ore Output Holds Up

Bureau of Mines reports that domestic mines produced 3,592 gross tons of iron ore in February and shipped 2,081,300 tons. These figures are virtually unchanged from January of this year, but show an increase of 31 pct for output and 36 pct for shipments over February, 1955.

See AEC Beryllium Contracts Soon

Contracts for purchase of 500,000 lb of beryllium metal are expected to be announced by Atomic Energy Commission in the near future. Deliveries will be spread over a 5-year period, it is believed. About 27 companies are definitely interested in the project.

Living Costs Up In April

Consumer price index rose 0.2 pct during the mid-March—mid-April period, Bureau of Labor Statistics reports. Major cause of the advance was food prices, which rose 0.6 pct during the period. But the April index of 109.6 was still 1.4 pct below that of April, 1955. Most other components of the index rose during the latest period, although transportation dipped 0.2 pct. Housing costs registered a rise of 0.1 pct.

Ford Predicts Dip In Profits, Output, Sales

Henry Ford II told Ford Motor Company's first public stockholders' meeting that he expects second and third quarter profits to be substantially under those of a year ago. Production and sales also will be considerably curtailed through third quarter at least, the company president predicted.

Uranium Program Extended

The government will extend its program of buying uranium from domestic producers for almost five years beyond the present deadline of March 31, 1962. AEC has announced a new buying program to start then, but prices will be lower and the government may not take all the metal that is offered.

Scrap Stays Duty-Free

Congress is continuing import duty exemption of most scrap metal except for lead and zinc. New bill continues exemption because of tight supply through June 30, 1957.


Only Auto Unemployment Gains

Labor Dept. surveys indicate employment improved this spring except in automotive centers. Pickup reflects seasonal gains in outdoor work. Durable goods employment was steady except for automotive.

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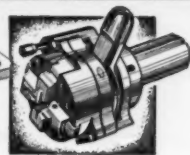
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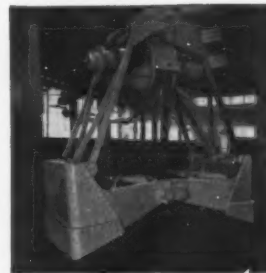
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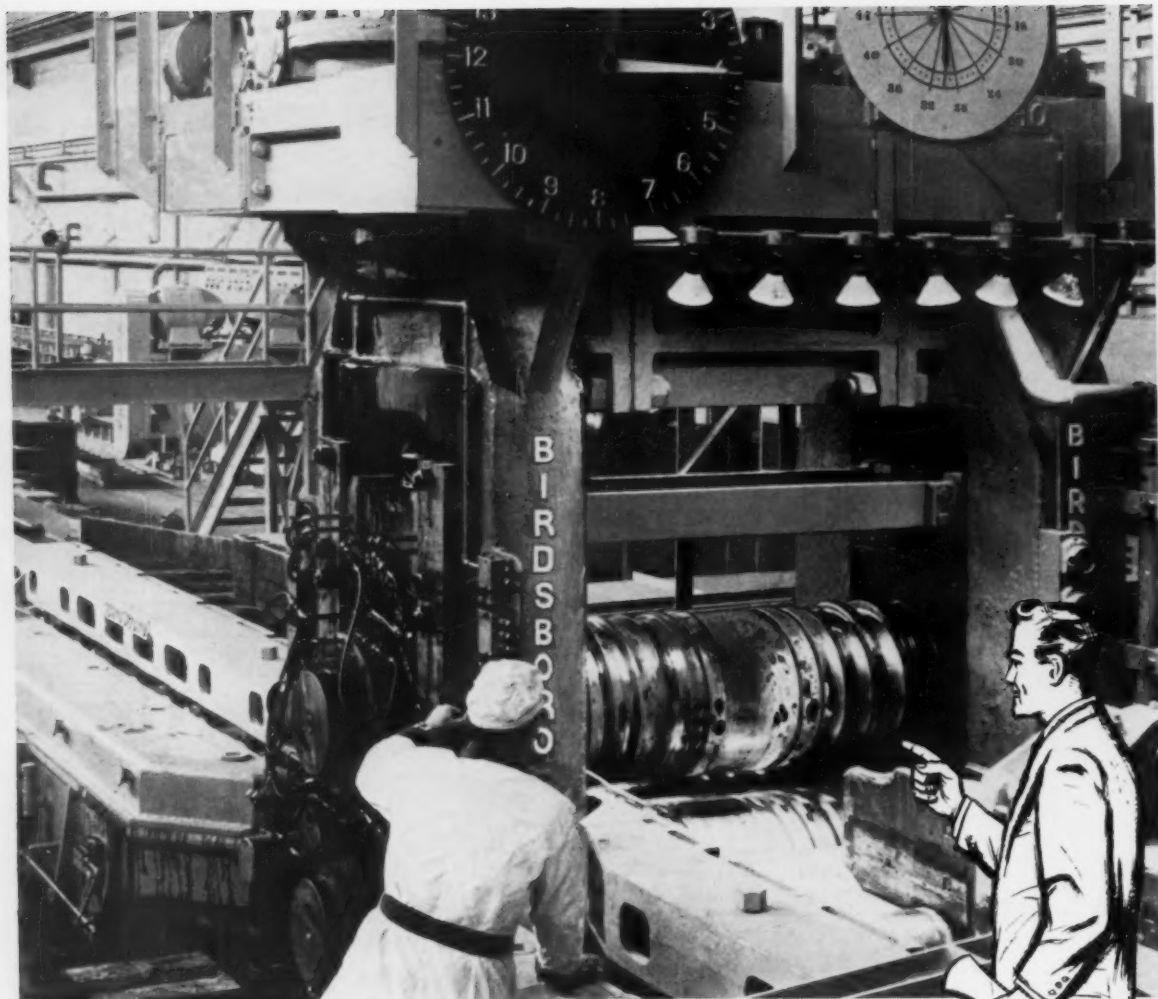
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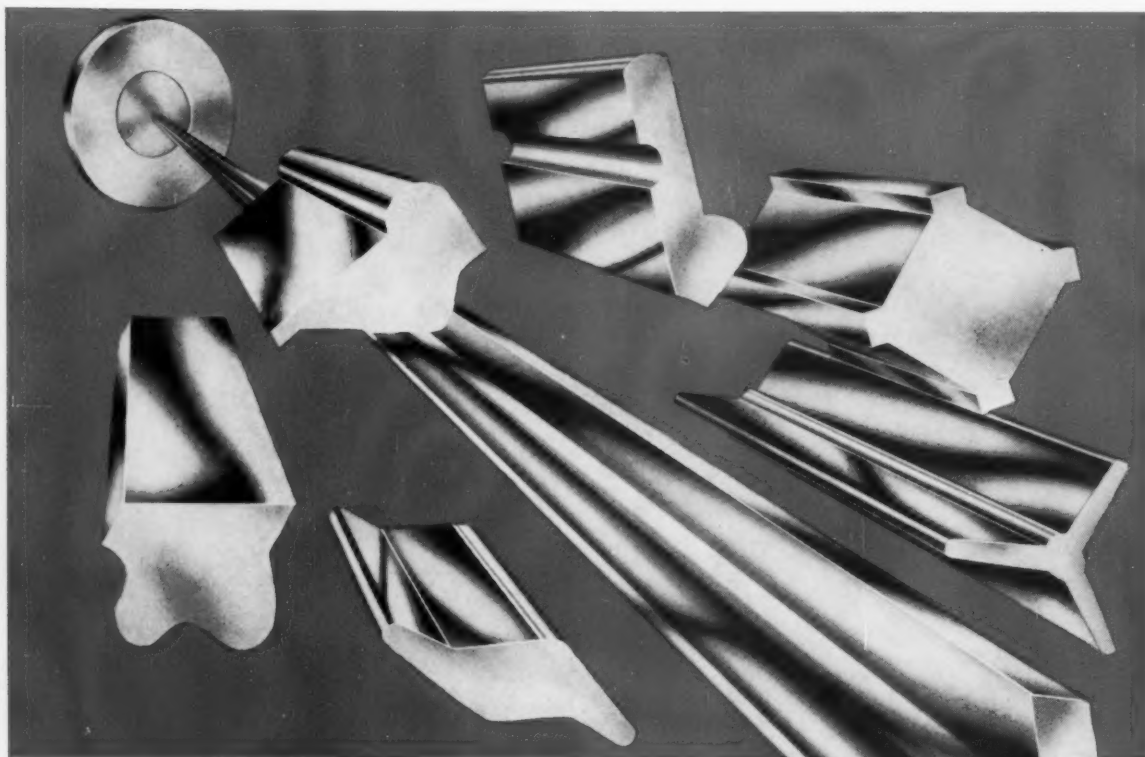
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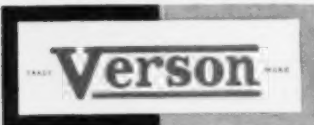
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